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### Accelerating Rubber Standardization

NO constructive policy for the great industry which it has served for a third of a century has been advocated by THE INDIA RUBBER WORLD more earnestly than that of standardization. Impartially viewing trade conditions from angles as various as a diamond's facets, and from an exceptional coign of vantage, it is convinced that the paramount reform to which at least the major divisions of the industry should address themselves is the elimination of "lost motion," needless varieties, nonessentials, and confusing criteria for judging raw and finished products. The trend of trade indicates that standardization is as

inevitable as the proverbial "death and taxes." Indeed, to maintain anything near the present profit average in the face of rising labor and material costs some such policy will have to be generally adopted. If then it must come, if it be so very helpful, why not devise means to speedily reach the goal? Accelerators for vulcanization increase in number and usefulness; a single good one for standardization would be a real boon.

So outstanding are the advantages of standardization, the wonder is that its adoption has not been urged more generally and enthusiastically. Primarily, it simplifies selling; it precludes misunderstanding between vender and purchaser; it betters quality; it lessens marketing costs; it enables manufacturers to engage in mass production of a few essential designs at minimum cost; it diminishes inefficiency and waste; it broadens the potential market, steadying production and employment; it lessens labor turnover; it decreases the hazard of both maker and dealer in accumulating stock during slack periods; and, by affording more time for development of designs and processes, it will encourage invention and promote economy and efficiency. Some striking advantages have been obtained by a few rubber manufacturers who "took the bull by the horns" and concentrated on a few worth-while standardized products; and the pity is that a legion of others are still scattering their ammunition.

### Dissecting Crude Rubber Costs

FAMILIAR enough with all the elements that enter into the cost of producing cotton, paradoxically the American rubber trade is strangely "shy" on information concerning the items that enter into the cost of the trade's most essential raw material—crude rubber. Americans are also the largest consumers of coffee, yet they know surprisingly little about the mode of evaluating or marketing the aromatic bean. They leave all such foreign details to experts. When rubber or coffee is low buyers quietly congratulate themselves; when either is high they rail loudly at growers, importers and brokers alike. Yet a knowledge of rubber cost accounting is very necessary to everyone who would justly appraise the crude rubber situation. In several particulars it differs strikingly from cotton cost accounting.

Many a quotation on crude rubber is given "f. o. b." In ordinary commerce that would mean an ultimate price; but it may not be so with rubber. With rubber f. o. b. generally means delivered at the shipping point, and includes such items as collecting and coagulating latex, sheeting, drying, and packing, land rental, local managers' salaries, plantation upkeep, depreciation, and export duty. Once the rubber starts on its way overseas more expenses must be reckoned with to

make up the "all-in" cost, which includes not only the items already mentioned but also freight, draft, rebate, insurance charges, directors' fees, secretaries' salaries and other home office expenses, bonus to estates' staffs, commission and sundry charges for sales in Europe.

It may be contended that growers could save much and thus be enabled to market their product cheaper were all sales and distribution made from some such port as Singapore. It sounds good in theory, but facilities in Singapore for marketing rubber do not and perhaps never will compare with those afforded by the British capital. So, too, it may be argued that further saving could be effected by sharply cutting down home administration expenses, even abolishing directors' fees, etc. Were the average fees abolished the saving would be but a fraction of a cent on a pound. It should not be forgotten, however, that in the greater number of cases the fees are well earned; most rubber estates directors really direct. The situation is not unlike that of a rubber factory making goods in an obscure town in Michigan and exhibiting and marketing them in a great commercial center like Detroit.

Assuming that before many months the law of supply and demand will once again be the chief influence in molding rubber prices, the hope for much cheaper rubber would appear to depend largely upon improved methods of production and the utilization of by-products. That some progress is now being made in that direction is shown by the reports of several leading companies. These reports show, too, how some concerns managed to pass safely through the slump period that spelled ruin for others. In four typical instances "all-in" costs were cut as follows for two years: 1920-21 and 1921-22—15.23d to 7.64d; 12.63d to 7.90d; 11.85d to 6.75d; and 10.28d to 6.61d. In some cases, it is claimed, production costs were reduced in the periods named to even as low as 4.50d per pound, so that a fair profit was possible even while rubber in London sold at an average in 1921 of 10.50d and in the fore part of 1922 at 8.75d per pound.

### Rubber Chemists in Council

WHILE the rubber industry has in the recent past made immense material progress it has also broadened with the years as have few other industries. For too long a time the rubber trade was in a sense self-centered and admitted few points of technical contact with other industries. Each factory preferred secrecy, jealously safeguarding every formula and process, sharing its information with no one, and distrustful of even casual visitors. As for chemists, only a few employed one each to test stock or compounding materials. Yesterday they were a necessary evil, a negative force; today they take the initiative, and through them the rubber trade has found that it has intimate relation with scores

of other industries and a larger opportunity of service than most others enjoy.

With the expansion of the business the chemists have kept well in the vanguard, sometimes almost revolutionizing the trade with their inventions and discoveries. No inconsiderable factor in furthering their work has been their annual national conferences. True, these yearly meets did not always make the broad, generous, truly scientific appeal as made, for instance, by the session recently held in New Haven, Connecticut, of the American Chemical Society, of which the Rubber Division has become an increasingly important section. The old-time attitude was often illiberal, even suspicious. To learn all possible from the other fellow, but share as little as possible was the thought. Of really informative papers and practical hints there were few.

The British Rubber Expositions and their Members' Conferences, by demonstrating so strikingly the opportunities of the industry and indicating the direction in which the chemists could be most helpful, proved the unwisdom of this attitude. Through these agencies manufacturers and chemists found that they had much more in common than they had hitherto realized, and that if much headway was to be made a free, frank interchange of views and technical information must replace the old policy of wariness and isolation. Perhaps all this may mean that treasured trade secrets will eventually go into the discard, but many of them are becoming obsolete anyway, and general efficiency counts for more than empirical formulas. For such loss there will be ample compensation in the production of standardized goods made on a greater scale and with more saving in time and material.

The Rubber Division has already quite justified its existence by considering many problems in rubber manufacturing, by helping much toward making it an exact science, and in outlining means for more economical production; so, too, the National Safety Council has done much in initiating measures for putting the industry on a higher plane. In fact, its usefulness has only begun. It is possible that before long, chemists, engineers, and manufacturers may evolve another conspicuous service by helping to establish in this country something analogous to the British Institution of the Rubber Industry.

ACCORDING TO NEWSPAPER GOSSIP ANOTHER RUBBER magnate is looking toward the Pacific Coast. This time it takes the form of dredging out a great basin between the city of Venice and Los Angeles and opening a waterway into the Pacific Ocean giving the "City of Angels" an additional huge harbor. Whether it means the erection of additional rubber mills is not divulged.

"A GOOD NAME IS RATHER TO BE CHOSEN THAN great riches, and loving favour rather than silver and gold." Proverbs 22:1.

# Financing, Producing and Marketing Plantation Rubber

## Concessions and Leases—Financing—Installation Costs—Marketing the Product—Plantation Profits

THE establishing of a rubber growing business in the Far East may differ from others somewhat in detail of procedure, yet it is governed by general principles similar to those which must be regarded in the acquiring of land and the setting up of practically any large scale horticultural industry. The first step is, of course, the acquisition of land. Where land may not be bought outright, ample areas of suitable soil may be secured by lease in almost every section of the Asiatic rubber-yielding region. As a rule, land is not high and rental is moderate.

Occasionally some very advantageous concessions are obtainable, but usually the securing of very favorable concessions involves negotiations too long and complex for most concerns seeking to establish rubber plantations. One typical concession was in the state of Johore and comprised 50,000 acres in sections of 30,000 and 20,000 acres each. The concessionaires got not only a 999-year lease and all agricultural rights but also mineral rights as well.

The annual rent per acre for the entire period of the lease is 50 cents, Straits currency, equal to 1s. 2d. British, or 26 cents United States currency. Ordinarily terms for land rentals have been \$1 per acre, Straits currency, equal to 2s. 4d. British, or 52 cents United States currency, for the first six years; and thereafter \$4 per acre, equal to 10s. British or \$2.08 United States currency.

The 50,000 acres are covered with separate leases for blocks of 2,500 acres each, and at least one-half of the total area must be cultivated, minimum development to be .10 per annum. Having kept and planted 10,000 acres, the syndicate has since been subletting a considerable part of its holdings at £2, 10s., equal to \$12.10 United States currency.

### Financing Planting Enterprises

While most of the pioneers in the rubber planting industry in Ceylon, British Malaya, and Sumatra used their own money to buy land and conduct cultivation generally, about nine tenths of the planting industry have been financed by British investors in the mother country, to whom the chances for profit in rubber have for a score of years made a peculiarly strong appeal. British agency firms took the initiative. Some were local im-

porters and brokers of rubber and some had branches in the East. While some of them put in their own money, many of them organized plantation companies, taking some of the stock themselves and disposing of the remainder among warehousemen, shippers, brokers, and others who would aid in the sale of cultivated rubber in preference to the wild product.

While a specific fee was in many cases paid for an agency promoting a plantation enterprise, many agencies preferred compensation in the form of a contract giving control of estates and the disposition of crops. Some firms made contracts for from fifteen to thirty years, entitling them to as much as five per cent of the receipts from the sale of rubber after it had been received, forwarded and disposed of to buyers. The Dutch planting enterprises were financed a little later in much the same way, much aid, however, being rendered by the banks of the Netherlands Indies, which controlled the disposition of the crops and often the estates' management.

### Cost of Installation

Land for a rubber plantation having been bought or leased, the next step is to prepare it for service. This involves chiefly surveying, jungle clearing, filling and burning; lining, holing and planting; roads and drains; superintendence, labor, etc.; houses, factory, etc.; miscellaneous items. Weeding costs, once an item of much size, have been much reduced through introduction of the creeper *Crotalaria*, which not only prevents weed growth but also enriches the soil as a nitrogenous fertilizer. In-

cluding all the items of expense referred to, and also adding average rent of land, one expert on rubber cultivation puts the total cost of bringing a plantation into bearing, that is, for a period of six years, at about £22 or \$106.70 (United States) per acre. By the cultivation meanwhile of catch or surface crops, as of tapioca, the net cost may be reduced to even half the given estimate.

An official Federated Malay States estimate on opening and maintaining until productive a 500-acre plantation gives an average cost for the first year, including all customary charges, of \$50.55 per acre (F. M. S.), £6, 2s. (British), or \$28.30 (United States). The average cost of upkeep per acre for each

COST OF OPENING AND BRINGING INTO BEARING 1,000 ACRES OF FOREST OR LALANG LAND FULLY EQUIPPED WITH PERMANENT BUILDINGS, FACTORY AND MACHINERY

	Sumatra Guilders	Java 4 Years. Guilders	Malaya Straits Dollars	Ceylon 6 Years. Rupees
U. S. currency equivalents.....	0.402	0.402	0.56	0.32
Expenses of land grant of 1,000 bouvus (1,750 acres).....	4,000	.....	.....	.....
Premium on land.....	.....	.....	3,000	.....
Survey fees, etc.....	.....	.....	1,000	.....
Value of 1,000 acres of forest land at 60 rupees per acre.....	.....	.....	.....	60,000
Rent 4 years.....	2,285	4,000	4,000	.....
Felling, clearing and burning 1,000 acres.....	23,000	15,000	15,000	.....
Cleaning up after burning.....	7,000	20,000	7,500	.....
Felling, lopping, burning and clean- ing 1,000 acres.....	.....	.....	.....	15,000
Weeding	.....	.....	.....	.....
1st 9 months.....	18,000	27,000	18,000	.....
2nd year.....	12,000	24,000	12,000	.....
3rd year.....	9,000	18,000	9,000	.....
4th year.....	5,000	12,000	5,000	.....
Weeding 1,000 acres for six years.....	.....	.....	.....	90,000
Draining.....	4,000	.....	5,000	15,000
Roads and drains.....	.....	12,000	.....	.....
Roads and bridges.....	8,000	.....	7,500	20,000
Lining, holing and filling.....	2,000	2,000	4,000	4,000
Planting and supplying.....	2,000	2,000	2,000	2,000
Nurseries or plants.....	2,000	4,000	.....	.....
Bungalows.....	.....	.....	4,000	6,000
Manager's.....	6,500	3,000	6,000	.....
Assistant manager's.....	4,500	2,500	4,000	.....
Clerks' or conductors'.....	.....	500	.....	.....
Factory and machinery.....	30,000	30,000	25,000	50,000
Lines for coolies, 100 rooms 10 by 12 feet.....	15,000	.....	.....	.....
Lines for coolies, 125 rooms.....	.....	20,000	.....	.....
Lines for coolies.....	.....	.....	20,000	24,000
Tools, etc.....	10,000	.....	10,000	10,000
Management	.....	.....	.....	.....
Manager (\$600 per month)	.....	.....	.....	.....
2 Assistants (\$200 each per month)	.....	.....	.....	.....
2 Clerks (\$100 each per month)	.....	.....	.....	.....
Contingencies (\$2,000 per annum)	.....	65,600	.....	.....
Hospitals, medicines, attendance, etc.....	15,000	10,000	15,000	.....
Cost of importing 300 coolies first 3 years, 31,500; cost of import- ing 400 coolies 4th year, 14,000;	.....	.....	.....	.....
Total.....	45,500	.....	.....	50,000
Cost advances.....	11,500	26,000	8,000	.....
Contingencies.....	.....	.....	.....	45,000
Manuring.....	.....	.....	.....	.....
	286,285	287,600	235,000	501,000
U. S. currency.....	\$115,086	\$119,635	\$131,600	\$160,320
Per acre.....	115.09	119.64	131.60	160.32
Trees per acre.....	108	149	149	149

More recent estimates place installation costs at \$73.60 in Sumatra; \$109.94 in Java, and \$137.42 in Malaya. The upkeep per acre costs \$20 in Sumatra, \$23 in Java, and \$29 in Malaya.

of four succeeding years is given as \$19.80 (F. M. S.), £2, 8s. (British) or \$11.09 (United States).

The foregoing estimate is based on planting of trees 20 feet by 20 feet, or 108 trees to an acre, and assumes that the return during the sixth year will not only provide for upkeep, manager's salary, and interest on outlay, but will also allow a small margin of profit.

#### Costs in Four Countries

In Sumatra, Java, and Malaya the installation period is often figured on a basis of four years; in Ceylon six years; and the installation time for the four countries ranges upward in the order named, being highest in Ceylon. Maintenance cost in the sixth year is lowest in Ceylon and higher in Sumatra, Java, and Malaya, in the order named. For f. o. b. costs Ceylon is lowest, and Sumatra, Malaya, and Java range upward as named.

The character of the installation expenses in each of the four countries and their estimated amounts are shown in the accompanying table on the preceding page.

#### Cost of Production

In figuring on the cost of producing a pound of rubber it is necessary to deal with the variable factor of the rate of exchange, and as the recent rise of the rupee and the Straits dollar materially affects estimates, a fair allowance is made for the enhanced money values. Ordinarily cost computations are made on either an f. o. b. (free on board at point of shipment from the producing country) basis, or on an "all-in" cost basis.

Under the heading of f. o. b. may be included the cost of collecting, manufacturing, and delivering the rubber to the shipping port, and in addition such charges as rent, duty, upkeep, resident management expense, and in many cases depreciation on buildings, utensils, etc. "All-in" cost includes the foregoing and such items as freight, draft and rebate, brokerage, insurance, directors' fees, office expenses, bonus to estate staff, commission, and sundry charges attending the sale of the product in Europe.

In the Malay peninsula, according to the report of C. E. Akers made in 1912 on conditions in the rubber industry in Brazil and the Orient, the average f. o. b. cost of producing a pound of rubber, and allowing for depreciation, was (in Straits currency):

	Cents
Collection .....	32
Preparation .....	6
Weeding .....	6
Roads, drains, cultivation .....	6
Management .....	7
Hospital .....	0 1/2
Transport .....	0 1/2
Commission .....	2
Rent .....	2 1/2
Export duty .....	2 1/2
Total (British, 28d.) .....	67 1/2

The same authority gives the added costs between f. o. b. and date of sale in Europe as averaging 3 1/4d., thus making the "all-in" cost total 1s. 10 1/4d. per pound.

#### Comparing Costs by Periods

As illustrating how production expense has varied in recent years, instances may be given of f. o. b. and "all-in" cost of rubber per pound as reported by several plantation companies at intervals during the past eleven years.

In 1912	Shillings	Pence
Singapore Para, F. O. B. ....	1	8 1/2
Kinta Kellas, F. O. B. ....	1	4.4
Perak, F. O. B. ....	1	4.7
Sialing, F. O. B. ....	1	8.4
Sempah, F. O. B. ....	1	3.5
Anglo-Malay, F. O. B. ....	1	2.32
Tali Ayer, All-in. ....	2	3
In 1916		
Pataling, F. O. B. ....	1	7.07
Selaba, All-in. ....	1	1.59
Sapomalandia, All-in. ....	1	3.62
London & Asiatic, All-in. ....	1	3.07
United Seedling, All-in. ....	1	0.60
Chemp, All-in. ....	1	3.79
See Report	1	1.37

In 1922	Shillings	Pence
Lumut, All-in. ....	..	6.61
Vallombrosa, All-in. ....	..	6.74
Ampat (Sumatra), All-in. ....	..	7.64
Sedenak, All-in. ....	..	9.06
New Crocodile R., All-in. ....	..	8.00
Gedong (Perak), All-in. ....	..	7.50
Cheviot, All-in. ....	..	9.20

The cost of administering the affairs of a rubber planting company from its home office, usually in London, varies with the size of the company, the extent of its business, etc. Some are managed with marked efficiency; some are fortunate; others are neither well managed nor fortunate. A typical report of one well-conducted company which harvested a rubber crop of 333,044 pounds (since much increased) showed London expenses as follows:

Administration, office expense, etc. ....	£564	7s.
Directors' fees .....	800	
Audit fees .....	25	s.
	£1,390	12s.

Another company with a crop of 780,972 pounds had home office expenses of £2,560, 6s.

#### How Rubber is Marketed

Rubber is seldom stored in any quantity on plantations. When produced it is sent as soon as possible either to Singapore, the world's great rubber market, or to London, as the controlling directors may elect. Before the war, great amounts of rubber held in public and private warehouses in London were auctioned weekly, the upset prices obtained largely influencing the quotations at which considerable quantities were sold privately. When prices during the war began to drop sharply the London auctions ceased, and Colombo and Singapore took to auctioning rubber on an extensive scale, Singapore alone in 1920 thus disposing of 24,544 tons, while more was traded in otherwise.

However, the accumulation of large stocks of rubber and the colonial restriction of exports are likely to make London once more the world's chief rubber market. A considerable amount of rubber is sold in advance of production, many companies disposing of a year's crop on forward sale at a price insuring a fair profit, or selling enough of a crop to guarantee payment of operating expenses. Deliveries may be made from the estates to London, New York, or Singapore.

#### Profits in Planting

While it is unlikely that rubber shares will ever again yield such phenomenal dividends as were declared on many between 1907 and 1915, it is also improbable that for many years to come bona fide planting enterprises will suffer any such reversal of fortune as many of them experienced in the past four or five years as a result of over-production and a world-wide trade slump. Experts see no reason why rubber growing should not enjoy a long period of prosperity. It may as a result of more scientific methods be even better stabilized and more uniformly profitable than the raising of many other world commodities.

Assuming that \$500,000,000 has been invested in some 2,000,000 acres of rubber-growing land, the outlay would in the light of present conditions appear well warranted. Such acreage is capable of yielding, at 400 pounds to the acre, some 800,000,000 pounds of rubber, or 400,000 short tons, an amount very close to present world demand. Well-managed companies, it is claimed, can now produce rubber at an "all-in" cost of 15 cents and even less per pound.<sup>1</sup> At a recent price of 33 cents the profit would therefore average 18 cents per pound, or \$72 per acre on a 400-pound basis. One of the highest estimates given on clearing, planting, and six years' development of a jungle into a rubber plantation was \$250 an acre. At the rate of \$72 profit this would mean 28.8 per cent on such \$250 investment. And this is not taking into account various economies that might yet be effected.

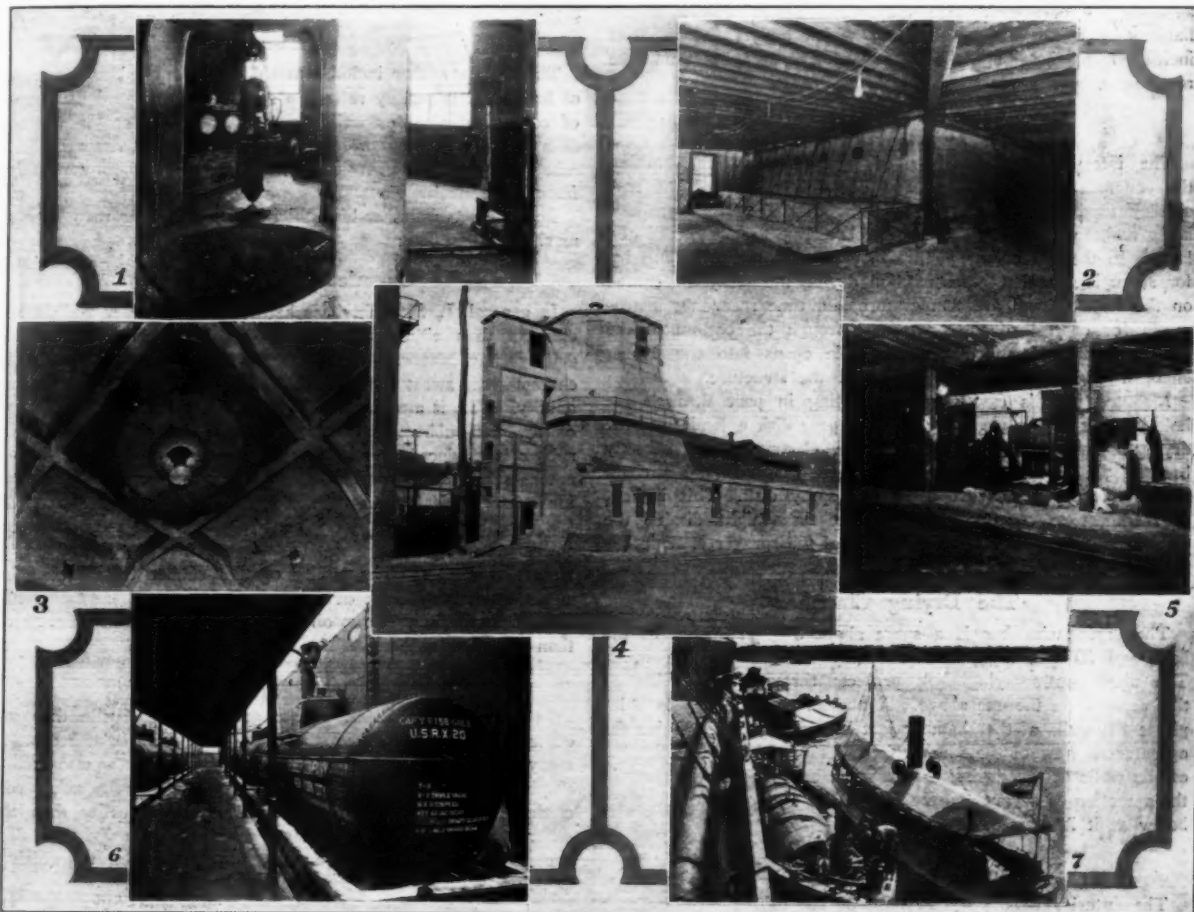
<sup>1</sup>See report of the Vallombrosa Co. for year ended March 31, 1922, and the Lumut Co. for the year September 30, 1922.

# Manufacture of L. S. Crude Rubber

## Coagulation Method Superseded—Preserving and Transporting Latex—Spraying and Drying Apparatus—Operation and Product

THE production of crêpe and smoked sheet rubber as regularly carried out on the plantations necessitates a complete manufacturing equipment for transforming the latex into the crude forms by the use of acetic acid coagulation and smoke

For crêpe the rubber is run off in sheets on wash and crêping rolls and dried. In making smoked sheets the main feature is a smoking process requiring several days for completion and conducted in a specially arranged smoke-house. In whichever way



United States Rubber Co.

1. SPRAYER ROOM SHOWING LATEX TANKS, HOT AIR FURNACE AND SPARE ROTOR. 2. BASE OF DRYING CHAMBER AND PLATE OF SPRAYED RUBBER. 3. CEILING OF CHAMBER SHOWING SPRAY DISK. 4. EXTERIOR OF THE PLANT. 5. BLOCKING THE RUBBER. 6. LATEX TANK CARS. 7. TANK LIGHTERS DELIVERING LATEX TO STEAMER AT BELAWAN, SUMATRA.

impregnation. The discovery of means whereby the latex can be utilized directly in rubber manufacturing, and the invention of a new form of crude known as L. S., or latex sprayed, rubber bid fair to radically change the hitherto standard plantation practice of crude rubber manufacture.

### Coagulation Method

The trees are tapped and the latex is carried in cans to collecting sheds scattered throughout the plantations, where it is placed in vats or pans. Acetic acid, in suitable amount, is next poured into it, coagulating and separating the crude rubber. The coagulum is removed and transported to the factory, where it undergoes the manufacturing process, varying according to whether the rubber is to take the form of crêpe or smoked sheet.

prepared, the sheet crude rubber is folded and pressed into bundles for boxing and baling.

### New Method of Handling Latex

By the new method the bulked latex as received in the collecting sheds receives the addition of a few per cent of ammonia which acts as a preservative to prevent coagulation. This prepared, the latex is run into tank cars and taken by rail to tide water, there to be transferred to tanks on lighters, from which it is reloaded into tanks on shipboard and forwarded overseas. If a vessel is not in port or storage space is not available, the latex is carried directly to a disk-spraying plant on the plantations and converted into L. S. rubber. All the details of loading and transporting the latex both by land and sea are carefully arranged. Experience and study are con-

stantly leading to modifications for greater efficiency and lower cost.

On arrival in New York the latex is pumped from ship tank to tank car, and transported to the latex spraying unit of the United States Rubber Co.'s plant at New Durham, New Jersey.

### Spraying Plant

The latex spraying plant, of which exterior and interior views are here shown, is built in square, pyramidal form with inwardly inclined walls converging above to an eight-sided room or tower story where the spraying, air heating, and mixing appliances are located. The illustration shows this structure flanked by a single story building which houses the facilities incidental to handling the latex before spraying and the resulting rubber product.

### Spraying Appliances

The interior of the eight-sided sprayer room surmounting the concrete drying chamber and containing most of the machinery used for spraying is also pictured. At the right are latex tanks with gage glasses for observing the height of the latex. In the left of the picture may be seen the brick furnace for supplying the hot gases used in drying the spray. Mounted on the furnace wall are temperature and time recording instruments for control of the process. Through the bottom of the deep cavity in the foreground, a hole opens into the drying chamber which is the main portion of the structure.

Mounted in this cavity and projecting in part through the hole is the spraying mechanism. The spray disk extends into the drying chamber and is driven by an electric rotor. Directly back of the sprayer cavity may be seen, suspended by a chain block and trolley, a spare rotor and spray disk. This is kept in readiness in event of any accident that might disable the working sprayer. The aluminum disk of the sprayer is 18 inches in diameter.

### The Drying Chamber

The drying chamber is a space about 30 feet square at the base and 30 feet high, with inwardly inclined concrete walls. The aluminum spraying disk projects through the ceiling of this room from the one above. A number of glassed peep holes pierce the walls of the chamber just below its ceiling to give the operators a view of the spray effect. The height and inclination of the walls of the drying compartment are important factors in the operation of drying and the free fall of the rubber to the floor below as it is formed.

### Base of the Drying Chamber

The exterior of the square base of the drying chamber may be seen in the illustration. The floor upon which the flakes of dry rubber fall consists of a series of plates on casters which allow them to pass through the drying compartment on tracks. A floor plate pushed in at one side thus forces out on the opposite side of the chamber a plate loaded with dry rubber. In the foreground of the picture is seen an empty floor section in position ready to be passed into the chamber through the protecting metal box extension. There is also shown a loaded floor section which has advanced from the chamber to the hydraulic baler. This view shows the depth of spongy dry rubber, thicker at the middle than at the ends of the section, as it falls in the chamber.

### Operation

The operation of the plant consists in flowing the preserved latex from the supply tanks onto the center of the revolving disk rotating at a high rate of speed in the top of the drying chamber. The action of the moving disk throws off the latex in a fine spray of umbrella form. The hot products of perfect combustion from

the oil burning furnace are mixed with fresh air by a blower and delivered through four sheet metal flues into the top of the drying chamber. Here they mingle with the atomized latex and dry its small particles instantly without raising their temperature to a point detrimental to the rubber. The drying chamber during operation is filled with fumes of ammonia and dry rubber particles falling like snow flakes onto the sectional floor below where they build up in a thick spongy layer.

Periodically an empty section of flooring is pushed into the side box extension of the base of the main drying chamber, progressing across the chamber into a similar box extension on the opposite side, from which it emerges and passes to the baler.

### Baling

The spongy rubber includes much air and resembles the crumb of bread. It is readily rolled up and broken by hand into lumps of convenient size for weighing, and is then placed in the box of a hydraulic baling press and solidified into a compact block; subsequently it is sewn in burlap for shipment to the rubber factory.

The characteristics and qualities of L. S. rubber may be summarized as follows:

### Chemical Characteristics

In general, L. S. rubber has higher ash and water and acetone extracts than either Pará or plantation rubbers. The sugars dried during evaporation in the spray process give the rubber its characteristic sweet odor. A noticeable feature is its tough nery quality. This is attributed to two causes, the presence and nature of the non-rubber constituents and the fact that the finished rubber is produced practically instantaneously and therefore need not be subjected to washing, smoking, drying, or milling required for other crudes. Test of this extra nery quality shows that L. S. rubber requires approximately 15 per cent more time and power consumption for breaking down than the best Pará or plantation grades. The ability of this rubber to absorb fillers is not appreciably different from that of standard plantation rubbers; however, it takes up oil during the mixing somewhat faster than do other rubbers.

### Physical Properties

In cured stocks L. S. rubber gives higher tensile than any other crude, slightly lower stretch and a higher set at break. In many cases tensile in excess of 4,000 pounds per square inch is obtained in 10 per cent sulphur mixing. It may be safely concluded that this rubber is of more uniform quality than any other commercial grade. Its color varies from light to dark brown, depending on the amount of compression to which it is subjected in baling.

### Rate of Cure

L. S. rubber possesses rapid curing quality which permits either economy in compounding cost by reduction of the amount of accelerator required or in curing cost, if shorter cure is desired. The natural accelerator is present in the water soluble new-rubber constituents. It is believed that some of these ingredients accelerate the rate of cure, some are neutral, and some may retard vulcanization.

### Aging Quality

This rubber has good aging quality. In this respect it is much superior to pale crêpe and smoked sheet and equal if not superior to upriver fine Pará.

### Application

L. S. rubber has been used in tire tread and carcass compounds, inner tubes, belting covers, cements and rubber goods generally. Its superiority in uniformity, aging, strength, and quick cure gives it a wide and growing application.

## Some Pros and Cons on Restriction

### Thinks 42½ Cents Little Enough

"NOT a scrap of increased tapping should be done until the price reaches 85 cents (F. M. S. currency, or 42½ cents U. S.) a pound."—*Straits Times*, Singapore.

### Not Paying Britain's U. S. War Debt

"Misinformed critics have a fantastic idea that the British are meeting their war debt to the United States with rubber. I can absolutely state that in no way, shape, or form is the revenue derived from this tax directly or indirectly paid to Great Britain, and under no circumstances can this tax be used to pay one cent of that British debt."—E. A. Barbour, Singapore.

### Governmental Interference an Evil

"I am convinced of the blighting effect of governmental interference with industrial enterprise in whatever direction it is attempted."—Walter J. New, Ceylon Consolidated Estates.

### Restriction Not a Cure-all

"We must rely upon ourselves, upon reduced cost of production, and prudent finance; and then the phenomenal expansion of road traffic all borne on rubber-shod wheels will bring us back to reasonably good profits."—Thomas North Christie, Sungei Way Co.

### Finds Americans Reasonable

"I am very much disappointed that the time of the committee is taken up with abuse of the rubber producers by British manufacturers. I found perfectly friendly atmosphere while in America, with the possible exception of Harvey Firestone. The English rubber growers are not ashamed of their industry; they consider it one of the most creditable performances in the history of British enterprise."—H. Eric Miller, delegate to America from the Rubber Growers' Association, testifying at a British Parliament inquiry into the crude rubber situation.

### Won't Harm American Manufacturers

"I do not believe that the United States rubber manufacturers will be at all injured by the measures taken to secure a stable price for rubber at levels which enable the industry to exist."—Winston Churchill, Colonial Secretary when the Stevenson restriction legislation was adopted for British Malaya and Ceylon.

### Intimates American Bluff

"We await the result of all the bombast in America with interest. We have clear recollections of American lick-creation plantation schemes in Mexico and also up the Amazon, where the most promising proposition was the Moju plantation."—*Tropical Life*, London.

### Laborite Alleges Growers Profiteer

"Company chairmen of rubber companies before their shareholders are boasting of producing rubber at 6d per pound, and some as low as 4½d per pound, and are through Mr. Churchill's kind offices selling rubber at 1s. 5d."—A. Mills, Assistant Secretary, Amalgamated Society of India Rubber Workers, Manchester.

### Says Manufacturers Take Advantage

"I am a user of rubber boots, and they are no cheaper now than when rubber was five times its present price, and they are ten times poorer stuff—pure fake; scarcely enough rubber in them to stick them together. Can Mr. Mills explain this and where the difference goes?"—A Shareholder, Waterford, England.

### How British Could Help Themselves

"It ought to be blazoned throughout the length and breadth of the land that 65,000 employes in the rubber trade are on short time, while 8,000 of them are in receipt of unemployment benefit. Everyone of these workpeople could be placed in full employment if British motorists would make up their minds to buy British-made tires."—Sir Harry Brittain, M. P., London.

### Questions Opponents' Motives

"It is only fair to credit the opposition with a policy based on principle, but in the United States the agitation is most blatantly one of self-interest, initiated by a large firm which is credited with having entered into a two-year contract with Henry Ford for the supply of motor tires based on rubber at 9d per pound."—*The Financier*, London.

### Says Mr. Ford Would Aid

"Mr. Ford has indicated that his full support may be counted upon in the efforts of American rubber manufacturers to obtain relief from the British rubber policy."—Daily Newspaper.

### Capital Needed for Planting

"With certain changes in the land laws the Philippines will be a garden spot for rubber. What is needed is capital, and I urge America to raise it and free us from the foreign grip now held on a commodity of vital importance to the public.

"America should produce its own rubber. The situation is critical and the time to act is right now."—Harvey S. Firestone in *Journal of Commerce*, New York.

### Ignores Debt as a Factor

"No one for a moment imagines that interest on the British debt will be defaulted if America takes less than 285,000 tons of rubber

### RUBBER RESTRICTION IN RHYME

When Stevenson applied his plan and rubber jumped to thirty-five, the rubber buyers to a man became alert, alarmed, alive. They hammered at the White House door, they deafened Hoover with their wails; they chewed the rag, they cursed and swore, with propaganda choked the mails. Three lads from Britain's R. G. A. came to our hospitable land. They looked, and then they went away, polite, inscrutable and bland. Three from our own R. A. A. returned the visit P. D. Q.; they just got back the other day, and gave the British point of view. The daily press sat in the game, and led the readers all to think that fixing prices was a shame, unless indeed such prices sink. Then Congress gave a bunch of dough, to get the first-hand planting dope, and rubber experts were not slow, to write, to wire, to talk, to hope, that they might sail the ocean grand where Britain does not own the sun, and in some far off rubber land put in some seeds and spend the mon'. But all such efforts were in vain, a Yale professor gets the boon, to visit Siam, Spak and Spain, Canaipuscaw and Cameroon.—Would Stevenson consent to come to this excited troubled land and raise our rubber prices some, and thus hold out a helping hand? [*Our Apologies to Walt Whitman.*]

this year, nor is it at all likely that American manufacturers will cease buying crude rubber from the British possessions unless the Stevenson Act is repealed."—*Automobile Topics*, New York.

### **Humor of the Situation**

"British rubber producers are restricting output with the deliberate purpose of forcing up the price. Some American cotton planters curtailed their acreage to keep prices up, but the boll weevil and the weather are the chief limiting factors. We wonder if our British cousins can see the humor of the situation? Cotton is much more essential to them than rubber."—*Automotive Industries*, New York.

### **R. A. A. Wouldn't Harm Growers**

"The association has not the slightest intention of causing or witnessing the financial ruin of plantation growers."—Horace De Lisser, President of the Rubber Association of America.

### **Estates Not Restricting**

An analysis of figures for British-owned rubber estates in various districts indicates that the total production of all estates for which December figures are available was not greatly affected during the first two months of restriction. Increased output is noted in the Dutch East Indies, sufficient to balance the slightly decreased outputs in other districts. In the Federated Malay States, Straits Settlements, and Ceylon, December production increased over that for November. Whether the excess production

over amounts exportable at the minimum rate is being held in stock or exported subject to the excess duties, cannot be stated. Included in the statistical compilation were 11 estates located in the Dutch East Indies, with a total "standard production" of 13,086,314 pounds; 5 estates in the Straits Settlements, with standard production of 8,260,098 pounds; 29 estates in the Federated Malay States, with standard production of 26,243,786 pounds; and 4 estates in Ceylon, with standard production of 1,945,620 pounds.—*Commerce Reports*, Washington, D. C.

### **Sure Restriction Means Shortage**

"The probable production of rubber during 1923, provided the present basis of restriction is maintained, will be about 310,000 tons. If the consumption in America and Canada in 1923 equals that of 1922—and present indications seem to justify such assumption—then Canada and America will require 300,000 tons. The rest of the world will need more than 100,000 tons. Therefore an actual shortage of rubber is certain."—Harvey S. Firestone.

### **Says Rival Interests Handicap R. A. A.**

"Mr. Firestone questions the ability of the Rubber Association of America to make a strong and united protest, in view of the diversified interests represented by its membership, which includes large plantation interests, rubber dealers, and importers, and rubber reclaiming companies, all of which, he said, would profit by the maintenance of the restriction and higher priced rubber."—*Journal of Commerce*, New York.

## **The Outgrowth of Rubber Restriction**

The Malay States Information Agency has received a telegram from the Government of the Federated Malay States notifying that a new rule under the Rubber Restriction Enactment has been passed, dated April 30, prohibiting the transfer of licenses or coupons except on bona fide sale of the rubber covered thereby.

Rubber restriction, as now practised in Ceylon, the Straits Settlements, the Federated Malay States, and the Non-Federated Malay States of Johore and Kedah, is not proving altogether satisfactory, judging from recent developments. For the sudden decline in crude rubber prices, just when everything pointed to a still further advance, there are many explanations offered.

Smuggling and traffic in licenses are mentioned as the main causes, and *The Financial Times*, of London, in a recent editorial states that the true reason lies deeper. "The exports of rubber, particularly for March, were very largely in excess of the amount contemplated under the scheme. Part of this excess might be the 15,000 tons of 'free' rubber in stock at Singapore and Penang in October last, but there seems also to have been some initial slackness in the organization of the scheme, particularly as regards the liberality of production licenses granted to native owners. The importance of the latter point is considerable, as, though few of the native-owned plantations are large, their total acreage exceeds one-third of that controlled by British companies."

### **Excess Production and Census Regulations**

In a further attempt to regulate excess production there has been issued a communique from the office of the Under Secretary, Federated Malay States, as follows:

"It having been brought to the notice of the government that many estates are not restricting production and are storing rubber in excess of the quantity which they are allowed to export, as a speculation and not merely as a reserve against the period of wintering; that rubber is being bought on a large scale without coupons or export license, with a view to its being stored until restriction ceases, notice is hereby given that legislation is being prepared to deal with the subject generally.

"Notice is also given that after January 1, 1923, licensed dealers in rubber will be required by rule made under the Rubber Dealers' Enactment to furnish monthly returns of the stock of rubber and export licenses or coupons in their possession, and that a census will be taken on May 1, 1923, of all rubber in the possession of producers."

### **Percentage of Restriction Relaxed**

Official announcement has been made that the Secretary for the Colonies has approved, for the quarter beginning May 1, the relaxation of the percentage of restriction to 65. This measure was advocated in view of the price of rubber on the London market having averaged a figure between 1s 3d and 1s 6d per pound for the quarter ended April 30.

In the event of an average price being maintained at not less than 1s 3d per pound, London landed terms, during three consecutive months, the percentage of production for the next ensuing quarter is raised automatically by 5, and if maintained at not less than 1s 6d per pound by 10 per cent for the next ensuing quarter. If the price does not average as much as 1s per pound during any three months the export percentage will be reduced to 55 per cent, the ratio of price and export being so adjusted, higher or lower as the case may be, in the same ratio.

### **Ceylon's Exports Increase**

That the exports of Ceylon-produced rubber have not been reduced may be readily seen from the following table, which shows shipments by months:

Period	Long Tons	Period	Long Tons
November, 1921	3,049	November, 1922	4,083
December, 1921	4,377	December, 1922	4,005
January, 1922	3,812	January, 1923	4,635
February, 1922	3,162	February, 1923	3,417
Total	14,400	Total	16,230

This shows an increase of shipments under the restriction period of 1,830 tons.

## Making Duplicate Molds by Hobbing

Accuracy, Ease of Working and Economy Favor Hobbing over Machining Duplicate Molds for Small Rubber Objects

THE present article has been prepared in response to the interest and inquiry with which domestic and foreign rubber manufacturers received our recent article<sup>1</sup> on the hobbing process of mold making, which illustrated and described the hydraulic and heat treating equipment required for producing hobs and explained their adaptability to the manufacture of molds for rubber and hard plastic work.

It was shown that ordinary machining methods for the production of certain molds are practically antiquated and inadequate for present day competition in popular lines of rubber and hard plastic objects where volume production is demanded.

The cheapest method to reproduce with accuracy and perfection of finish such cavities is by the hobbing process. It

on the investment. Also, hobbing is work for skilled mechanics who understand the making of hobs and how to sink them.

It is not the purpose of this article to describe hobbing methods in detail. This is next to an impossibility, for each hobbing job is a problem in itself requiring individual thought for solution. The methods used on any previous hobbing job are not always an indication of what may have to be done on the next one to attain success.

### Steels for Hob and Die

Two factors enter into successful hobbing. The first is a hardened tool steel hob with or without engraving, made with proper contour and preferably with a slight taper or draft. It must have highly polished surfaces and no under cuts. All surface scratches and marks of every kind must be removed, otherwise they will be transmitted to the hobbled impression. Even a piece of lint between the hob and impression will be

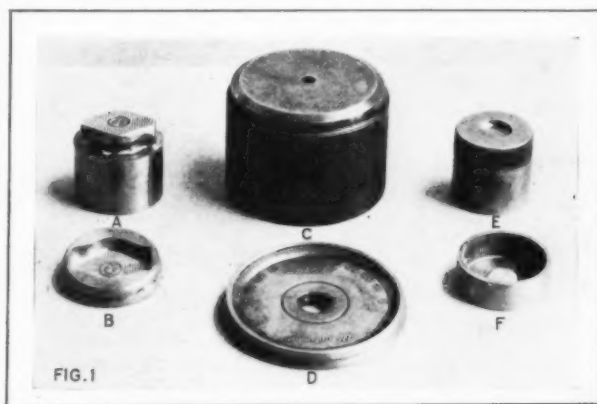


FIG. 1 Master Hobs and Corresponding Dies Made from Them

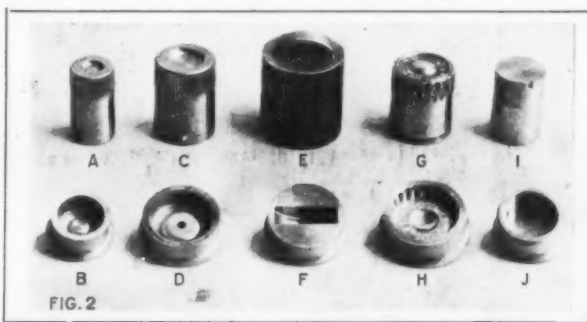


FIG. 2

is applicable where machinery methods are entirely inadequate and of prohibitive cost.

### Hobbing Defined

Briefly defined, hobbing is the production of dies in metal by the impression of a hob, hydraulic power being employed. The hob is a duplicate in hardened tool steel of the object to be molded in the hobbled die.

It is obvious that hobbled dies, molds, cavities or impressions, as they are variously termed, outclass by their advantages those produced by the usual machining methods. The more important of these advantages are: Accuracy of reproduction as to size and perfection of finish of the molded objects; less cost per cavity where many impressions are required; convenient replacement of broken dies; rapid heating and cooling, and the elimination of mold handling by pressmen when suitably mounted, thus increasing output of goods at lower labor cost.

These advantages will be made clear by contrasting machined and hobbled molds in a few characteristic mold problems.

### Advantages of Hobbled Dies

The most satisfactory solution of the multiple cavity mold problem is to hob the impressions wherever this is practicable. The art of cold hobbing dies is not as generally understood as it deserves to be, probably because with the ordinary methods of molding slow curing material only a few dies or impressions are used. Machining was resorted to because the outlay for a hydraulic equipment for hobbing only a few dies a year would not return a profit

found to have left its imprint after the hobbing operation. No oil or lubricant should be used between hob and die if a high luster is desired.

The second factor comprises the blanks for the impressions; these should be made from a low carbon machinery steel and annealed before using. Generally the stock received from the jobber is of unknown quantity and may contain hard spots. The more thorough the annealing and the softer the blank the less pressure is required to sink the hob. A few points variation of carbon content in the steel may increase the pressure required to hob by 100 per cent and the results will be unsatisfactory due to the poor flowing quality of the steel. It is possible to hob well annealed tool steels within certain limits but they do not lend themselves readily to deep hobbing because of their poor flowing quality.

### Pressure for Hobbing

Pressures required for hobbing vary from 50 tons to 200 tons per square inch, depending upon the method adopted. A blank or impression which is confined within a chase ring might require for machinery steel approximately 100 tons per square inch. The same blank stock of larger diameter but unconfined would probably hob readily at 50 tons per square inch. It would be found, however, that the piece hobbled in the chase would be true to the size of the hob, whereas the piece hobbled unconfined would be loose on the hob, due to the fact that the metal flows away from the hob while being sunk. The amount of this spread is dependent largely upon the shape of the hob and the amount of stock in the excess diameter left to withstand the

<sup>1</sup>THE INDIA RUBBER WORLD, February 1, 1923, 285-287.

lateral pressure. In case of articles requiring exact duplication and accuracy of size such as in molded plastic work, the method of open hobbing cannot be used.

### Hobbing Without Chase

Hobbing an unconfined piece also has the disadvantage that if the hob has any projections or bosses these are apt to be sheared off by the spreading of the blank. When hobbing a large piece with a press which has too small a capacity for the work it is often necessary to anneal the die or impression several times before it is finally carried to its proper depth. Repeated annealing has a decided disadvantage because wherever the hob stops

shown in vertical section, comprising a knurled ring E and a base plate F. These fitted together form the die, but it will be noted that the die contains no chamfer; therefore the knob produced will be sharp-edged, as shown in D, Fig. 3, at the angles marked Y. The knob thus requires some machining after molding to finish it.

In the case of this machined die the knurls are either broached or slotted in a separate ring, which is then fitted to a separate bottom piece, F. As a consequence it is impossible to mold a chamfer on the piece. After a short period in service the joint Y between these dies opens slightly, allowing molding material to get between them and form a slight fin, which breaks the

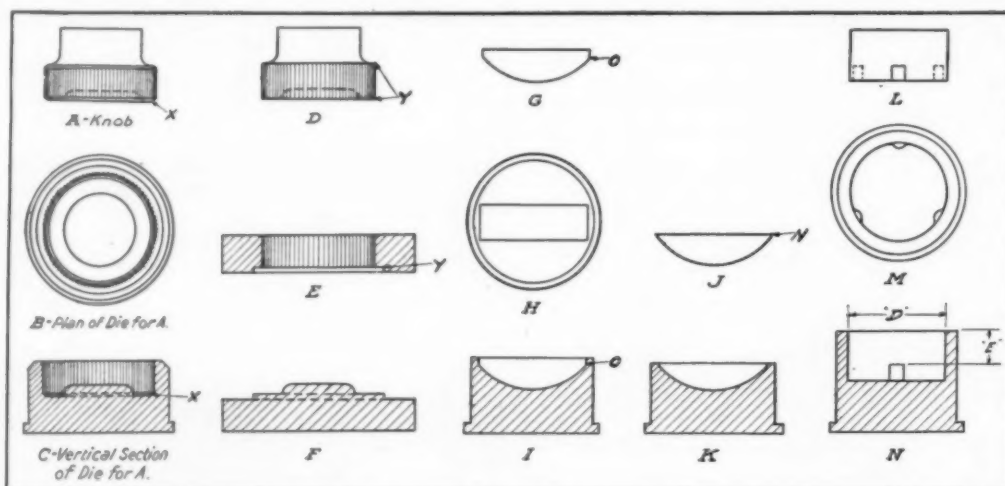


Fig. 3. Machining Methods of Making Unchamfered Knob Dies

and starts again a slight wave or ridge will show on the periphery or diameter of the impression for each successive operation. The only successful way to overcome this defect is to use a press of sufficient capacity to sink the hob at a single pressing. Every hobbing job is virtually a problem by itself and it is necessary on each one to determine by trial the exact shape and size of blank required to obtain the desired results.

### Typical Hobs and Dies

Two series of master hobs and the corresponding dies made from them are shown in Figs. 1 and 2. Examination of these figures make evident the mechanical impracticability and the prohibitive cost of producing, by ordinary machine work, duplicates of any of the pieces shown, particularly when it is remembered that each is made in a single piece. Referring to Fig. 1, the hob A and corresponding die B illustrate this point very clearly, as do all the others.

For example, D in Fig. 1 is a 4-inch radio graduated dial impression. To make this by machining methods it would be necessary to relieve and mill away all surfaces of the impression except the raised lines, numbers and letters of the graduation; as a consequence, no two impressions would be exact duplicates and there would be inferior surface polish. By the hobbing method all lines, figures and letters are brought up sharply and the polish of the hob is imparted to the finished piece.

Chamfered edge knurled knobs are produced by dies F in Fig. 1 and B and D in Fig. 2, requiring no finishing after molding. In Fig. 3 A shows the knob and B and C, respectively, the plan and vertical section of the die with the chamfer hobbled in with the serrations or knurls at one operation.

The machining method of making a die for these knobs, unchamfered, is illustrated in Fig. 3, where the two-part die is

corners of the molded piece when ejected. Compare the finished molded piece A in Fig. 3 as it comes from the hobbled die, and the partly finished piece D, Fig. 3, as it comes from a two-part die, necessitating an extra finishing operation to chamfer each edge at Y.

Comparison of G, H, and I in Fig. 3 with J and K in Fig. 3 shows the hob seen at E in Fig. 2, and the nearest approach to it that can be made by machining. The object to be molded is a deep circular section with flattened ends. As molded from a machined die the piece would have a knife edge at the ends and require grinding to finish them cut square.

Similarly, compare I and J in Fig. 2, which are hob and die, respectively, for a cylinder having three vertical projections extending a short distance up from the bottom, with the machine die M and N in Fig. 3 for molding the same object, L in Fig. 3.

By machining methods it would be necessary to bore piece N to depth E and then mill away the portion below that line, leaving only the inwardly projecting lugs. This method would require considerable time to machine and polish, whereas by the hobbing method it is possible to form this die at one pressing and obtain a perfect polish.

A hob and die knob more elaborately designed is G and H in Fig. 2, which illustrates how lettering and scalloped edges are brought up at one pressing. From the illustrations here given it is evident that the possibilities of the hobbing method are almost limitless and can be used to advantage in other lines of work beside mold making.

IN JANUARY OF THE PRESENT YEAR ARGENTINA OUTSTRIPPED other countries of the world in her purchases of our canvas shoes with rubber soles. The transaction included 128,000 pairs of shoes, valued at \$98,915.

# The Care and Repair of Rubber Machinery

The Plant Engineer, Machinist, Plumber, Steam Fitter, Carpenter and Electrician—Their Work and Equipment

THE problem of maintenance, which includes the installation, care, and repair of mechanical equipment in a rubber factory, is one of the biggest items in plant management today, and the manufacturer who has solved it is reaping his rewards in low expense of upkeep, 100 per cent production, and slow depreciation.

Considered as a whole the rubber factory, whether it manufactures tires, tubes, mechanical goods, druggists' sundries, or footwear, is essentially a machine, and with better care it will last longer and will run more smoothly. The management is vitally concerned because proper care means more production; every

worker in the plant should be interested because the more smoothly it runs the greater his earning power and the better working conditions will be. But the man who is most concerned of all is the maintenance man himself, or plant engineer, whose job is first, last, and always to keep the wheels going.

To do the job right the department must have two things: proper equipment and efficient man-power. What the proper proportion is depends entirely upon the age of the plant, quality of goods manufactured, and shop discipline. The mechanical force is the busiest when the mill is idle, as this affords the best opportunity to repair broken equipment, replace worn parts, and get the plant tuned up for the productive period that follows a slump.

## Machine, Carpenter and Blacksmith Shops

To handle all kinds of repairs, as well as to make new equipment, every rubber factory is equipped with an up-to-date machine and carpenter shop. This should be centrally located on the first floor if possible, in close proximity to the mill room and power plant. If the building is laid out according to the U-type, a good location for these shops is in a separate building in the center of the rear yard. Overhead trolley connections from the mill room are essential so that heavy rolls can be conveyed to the machine shop for repairs without loss of time. In one end the pipe shop may be conveniently located, the machine shop with its lathes, planers, drill presses in the center, and the carpenter shop on the further end, with the blacksmith shop in the rear with door connections to both departments.

Here are employed various kinds of mechanics, who may be called the men behind the lines, without whom the plant could not be maintained. Machine tool operators for operating power drill presses, light and heavy lathes, planers, pipe cutters, and

roll-grinding machinery are necessary. Lathes are used for cutting and shaping various kinds of equipment such as bars for wind-ups on calenders, making machine bolts and screws, cutting out rolls for calender work on soles and uppers in footwear, mold work, etc., in druggists' sundries, and carriage cloth in auto topping. Machinery for grinding calender rolls is used to eliminate rough marks caused by metal or dirt getting in the compound, to change the pitch of the roll face in case a different kind of bank is desired on friction work, and to keep the rolls tuned up. A modern tool room completes the equipment.

The carpenter shop has considerable upkeep work to do, repairing doors, windows, roofs, and skylights. A wood pattern maker should be on the force to construct new light mechanical apparatus, of which every mill has its own varieties. General construction work keeps several men employed making braces, sills, platforms, work benches, racks and partitions as changes in layout demand. Footwear, tire,

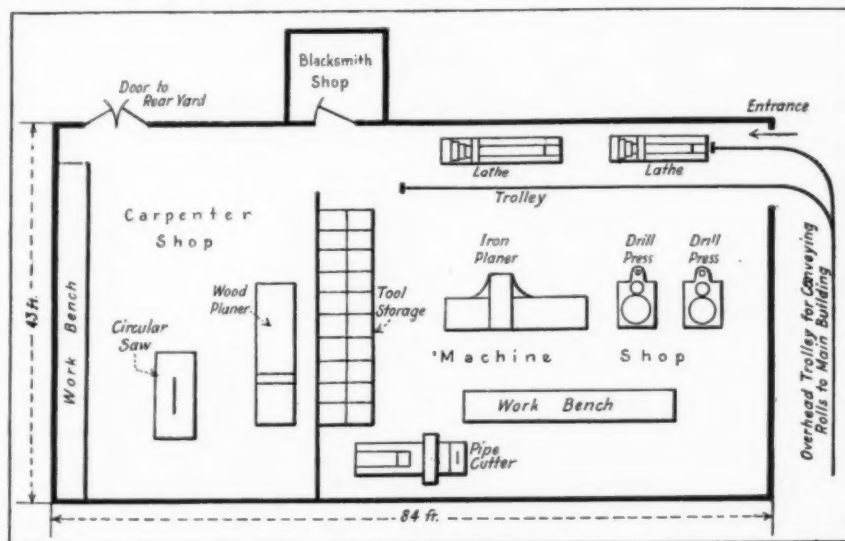
and mechanical plants all use various kinds of books and frames as containers for shoe parts, treads, cord pockets, strips, etc. These are subjected to rough handling in the best managed plants and are constantly in need of repair. The shop should be equipped with circular and band saws, planers, wood lathes, as well as the usual hand tools. Some plants make their own mandrels, which are constructed by carpenters.

The blacksmith shop is located in the rear of the machine and carpenter shop, with doors opening into each, as the company blacksmith works in close conjunction with both departments. He is kept busy repairing trucks, braces, overhead chains and hoists, platform scales, shoe sticks, and all kinds of conveyance equipment, of which every factory has a great deal and which requires constant attention.

Details of an ideal layout for these departments are shown in the accompanying illustration.

## Trouble Scouts

Properly manned, the mechanical department consists of groups of men who are specialists in certain classes of work. First among these are the operating men, who do routine work of oiling, greasing, and inspecting machinery at certain periods of the day, the rest of their time being spent in watching the machinery operate and preventing trouble. The mill and calender department of every rubber mill should have one or more of these



Plan of the Mechanical Departments

mechanics on duty at all times. One of the most important functions of the job is watching machinery operate. This type of mechanic is trained to listen for noises which may mean trouble. He inspects mills and calenders to see that the boxes are tight, that the gears are in right mesh, and that the calender and mill men take proper care of their machines. When repairs become necessary he supervises the work on large jobs and does the small ones himself. Common breakdowns that occur on this class of heavy machinery include cracking of mill frames, due to cold or hard stock, cracking of the rolls themselves, stripping of gears, broken or leaky pipe connections, broken chain links on wind-ups, and other less serious adjustments.

Moving heavy machinery such as mills, calenders, presses, beam cutters, etc., is frequently necessary, owing to breakage, change of layout, or the installation of new equipment. This work usually has to be done quickly in order not to hold up production. A skilled crew knows just how to handle jacks, rolls, and levers in moving broken rolls out and rolling new machinery into place.

### Machine Adjusters

All of the mechanical force mentioned thus far has been concerned chiefly with repair work on heavy machinery. There is another class of work which includes more delicate or lighter machinery. Here mechanics are required who are more skilled in making adjustments than in repairing actual breaks. Power stitching machines on wrappers, raincoats, and shoe uppers, eye-letters, grommet machines, fiber case staplers, carton making machinery, and various small machines come under this classification. The usual policy on this kind of work is to have a maintenance mechanic on duty in the department to make adjustments. If the department be a small one the mechanic might conceivably be the foreman in charge.

### Tool Makers

Another group of mechanics, known as "die sinkers," is employed in making dies, jigs, and molds required by every tire, footwear, mechanical, heel, and sundry mill. Trademarks on goods like heels and shoes change frequently and new bottom plates must be cut out. Many plants place a key mark in cipher on all their goods, showing the date and identifying the maker. These are changed monthly and a mechanic is kept busy on this work alone. While very few tire factories, except the larger ones, make their own molds, practically all are equipped to do so, and all boring mill work of making changes in molds is done in their own shops. An acetylene welding outfit is necessary to repair broken bull-rings and all kinds of damaged steel and cast iron.

### The Millwright

The installation and care of shafting, pulleys, and belting comes within the province of the millwright. The type of mechanic is needed in this work who can line up shafting properly so that the belts run smoothly on the pulleys and the correct ratio of speed and power is obtained. Such a man is never satisfied with patching up pulleys to keep the belts from slipping off, but would rather rip out the whole installation and line it up properly. The general routine of this work consists in lacing and greasing belts. The care of elevators and hoisting equipment requires the services of a millwright who has a keen sense of the strength of materials. He must be constantly seeking trouble, for some small nut loose may mean a serious accident.

### Steam Fitters

The large amount of piping on mills, calenders, presses, and vulcanizers calls for the services of an experienced plumbing and pipe-fitting force. These journeymen must be able to lay out and build a system of piping, re-pipe when necessary, and perform such maintenance work as looking after steam-trap

valves and regulating delicate instruments for recording pressure and temperatures on vulcanizers. In large plants a regular plumbing force is maintained besides, to care for the toilets and wash rooms, which become a real problem when used by several thousand people a day.

Closely allied with this work is the care of hydraulic equipment such as accumulators, presses, and tire vulcanizers, and if the plant uses any such equipment a man experienced on it should be detailed to look after it. The boiler plant also requires a great deal of attention in order that the maximum steam heat be transmitted to the vulcanizers.

### The Electrician

As electric power is used in 95 per cent of all rubber mills today a force of electricians is necessary, whether the power is bought from an outside company and brought in through transformers or manufactured in the plant. The electrician's duties are not so much maintenance as they are operating. One of the big advantages of electrical operation is that it functions steadily from day to day. Construction work such as installing new motors, lighting and power circuits, occupies most of the electrician's time. The routine work consists of oiling and cleaning the apparatus. The oiling of motors should always be the electrician's job, as a mechanic unversed in motors does not know which parts require oil and which do not. If he goes on the principle that every bearing should be oiled, stalled motors are liable to be the result. Repair work consists in replacing blown-out fuses, worn insulation, etc., and is fairly simple. Problems of plant lighting which have a direct bearing on efficiency can be controlled through the electrician, especially in installing lights in new additions or units. Savings can also be made in the plant light bill by a systematic turning out of unused lamps during the middle of the day. Similarly savings of power can be effected by a check on motors running idle.

### Department Organization

The organization of the entire department differs in various plants, one method being to have a foreman or gang boss for each class of work, maintenance, machine shop, plumber, carpenter, millwright, electrician, etc., who reports directly to the plant engineer; another being to have a general foreman who has had wide enough experience to supervise all classes of work, to whom the various gangs report. It is desirable to have some sort of control system such as a work scheduling board under the eye of the general foreman, as the work is so scattered and varied and comes so spasmodically that efficiency is difficult without it.

### The Plant Engineer

The plant engineer is perhaps most successful when he joins the company at its inception. Then he can be of valuable assistance in determining the location and layout of the factory. He sees the plant always as a machine which requires coal, water power, and electricity. He understands the folly of locating in the middle of a large city, for example, where the water pressure and supply are inadequate owing to the demands made upon it, where power is expensive and hard to get, and where there is no room for expansion. Mistakes made at the outset are not easily rectified thereafter, and thus we find that the successful operation of many rubber factories today is due in no small measure to the planning and advice of the plant engineer.

AMERICAN TIRES DOMINATE THE MARKET IN BOLIVIA. CORD TIRES, both clincher and straightside, are favored as they hold up much longer than the fabric on the rough cobblestone streets which are universal there. The use of straightside tires is increasing as new cars being brought in are generally equipped for them. Price is the principal factor rather than make.

# Aging of Rubber Latex Paper<sup>1</sup>

## Some Observations on the Oxidation of Rubber in Paper

By Merle B. Shaw, Associate Technologist, and F. T. Carson, Assistant Physicist, Bureau of Standards

As indicated by Shaw and Bicking<sup>2</sup> in their report on experiments with rubber latex in paper, "great difficulty has been encountered in getting a complete extraction of rosin and rubber from the paper and a separation of the two materials." Attempts at check analyses were very discouraging. Subsequent experiments indicate that the difficulty lay in comparatively rapid changes in the chemical composition of the finely divided rubber in contact with air, rather than in the limitations of the method of analysis. The usual solvents for rubber analysis were used and suitable modifications of method made to meet the special conditions encountered. The method of analysis of latex to determine the amount necessary for a given beater furnish and the method of determination of rubber in the finished paper are given below.

### Analysis of Rubber Latex

A known amount of latex is coagulated and extracted, first with acetone and then with chloroform according to the following procedure: Provide a siphon extraction cup with a glass cover, place in the bottom a shallow "cup" made of filter paper and fill the extraction cup loosely with tufts of absorbent cotton or high grade filter paper cut elliptically and folded so as to form fluted disks. Dry and weigh. Remove the cotton or filter paper and, replacing it one piece at a time, allow 2 cm<sup>3</sup> of latex to fall, drop by drop, into the cotton or filter paper so that a large surface of exposure of latex will be had and result in the facilitation of extraction. Weigh again and determine by difference the weight of latex to be analyzed. It is well to check the weight by allowing 2 cm<sup>3</sup> of latex to fall in the same manner from the same pipette into a weighing bottle and determining the weight. Keep the siphon cup containing dried cotton or filter paper in a desiccator as much of the time as possible or else allow the moisture content to come to equilibrium with the atmosphere of the laboratory and reweigh before deposition of latex. A filter thimble may be used in which to deposit the latex and should be weighed in a weighing bottle.

Now coagulate the latex by adding 8 or 10 cm<sup>3</sup> of a 5 per cent aqueous solution of acetic acid to the material in the extraction cup. Add acetone equivalent to nine times the volume of dilute acetic acid used in coagulation and extract for 48 hours (about 5 or 6 evacuations of the siphon cup per hour) in an extractor of the type ordinarily used for extraction of rosin (see Bureau of Standards Circular No. 107). Dry the extract at 105 degrees C. for one hour, weigh and report as acetone extract (resins) in percentage of weight of latex analyzed. Extract the residue remaining in the siphon cup for an additional 48 hours with chloroform. Use a weighed extraction flask, since it is difficult to transfer the chloroform extract to a weighing dish. Dry the extract in a vacuum drier if one is available, or in an oven at 70 degrees or 80 degrees C. to constant weight. Prolonged heating is to be avoided. Report as chloroform extract (rubber) in percentage of weight of latex analyzed. Dry the siphon cup with contents and weigh. Using the weight of siphon cup and dry material obtained before deposition of latex, determine the weight of the final residue and report as insoluble material in percentage of weight of latex analyzed. Make the analysis in duplicate.

### Quantitative Determination of Rubber in Paper

Cut the paper in strips about one inch wide and fold in numerous crosswise folds as for rosin extraction. Extract for 48 hours (five or six evacuations of the siphon cup per hour) with diluted acetone, which has been prepared by adding 100 cm<sup>3</sup> of a 5 per cent aqueous solution of acetic acid to each liter of extraction solvent. Alcohol may be used instead of acetone, but a greater length of time is required for the complete extraction of resinous material. Dry the extract at 105 degrees C. for one hour and weigh. Report as acetone extract (resins) in percentage of weight of paper used. Extract the paper for the same period with chloroform. After evaporation of the solvent dry the extract below 80 degrees C., preferably in a vacuum drier, and weigh. If the extract is not clear, but colored by resins which did not come out completely during extraction with acetone, take up the resinous matter in acetone (or alcohol). Dry and reweigh the extraction flask. Add the difference in weight to the weight of acetone extract previously obtained. Report residue (insoluble in acetone) as chloroform extract (rubber) in percentage of weight of paper used.

Paper will contain resins which were added as such in the beater and also resins from the latex added. The amount of acetone extract (resins) and chloroform extract (rubber) from latex will vary considerably with latex from different sources. The rubber in paper breaks down to form material soluble in acetone. For these reasons there is at present no means of determining the amount of latex originally added, or of determining rosin added as such together with latex in the beater.

### Results of Analyses

As stated above there was difficulty in standardizing the method of analysis of the experimental rubber latex paper made. The freshly made paper revealed reasonable quantities of rubber on analysis. Later analyses gave almost inappreciable amounts of rubber. At length it was noted that the analyses indicated a consistent decrease of rubber with a corresponding increase of resins with the age of the paper. It is a well-known fact that rubber oxidizes to form resinous material soluble in acetone. The change appeared to be most rapid in paper made of sulphite and soda pulp. In order to obtain more definite data on the rate of oxidation a special machine run was made using sulphite and soda pulp in equal quantities, to which were added 3 per cent rosin, 2 per cent rubber and 6 per cent alum based on weight of stock. The stock was in the beater about six and one-half hours. The details of the run were essentially those described by Shaw and Bicking under the heading "Book Paper," in the report referred to previously. "The stock for the machine was prepared, including the size, and then just before dropping it to the chest the beater roll was raised and the diluted latex added. The latex, diluted with water one to thirty (making dilution approximately 1 to 100 when figured on rubber content), was screened through a 100 mesh screen and added to the beater very slowly, fifteen minutes being allowed for this process. Five minutes after having added the latex the alum was added and five minutes later the stock was dropped to the chest. The time elapsing before the stock went on the machine was about fifty minutes, during which time the stock was continually being agitated in the machine chest. The above treatment allowed sufficient time for a complete coagulation of the rubber." Latex from an air-

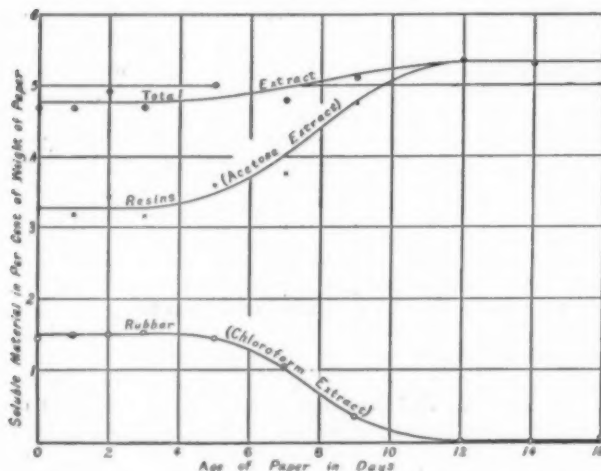
<sup>1</sup> Published by permission of the Director of the Bureau of Standards, of the Department of Commerce.

<sup>2</sup> Paper Trade Journal, Vol. 75, No. 26.

tight sealed can freshly opened was used in this run. It analyzed as follows, according to the method already given:

Acetone extract (resins).....	Per cent
Chloroform extract (rubber).....	3.3
Insoluble material.....	29.2
	2.9

Calculated on weight of pulp, 6.85 per cent of latex was therefore necessary to give 2 per cent of rubber. A sample of the paper from this run was festooned in the laboratory and analyzed in duplicate on successive days by the method of analysis of



Oxidation of Rubber in Paper to Acetone Soluble Material

paper described above. The data are tabulated in Table I, and shown in the above graph.

TABLE I

Age of Paper in air Days	Acetone Extract, (Resins), Per Cent			Chloroform Extract, (Rubber) Per Cent			Total Extract Per Cent		
	(1)	(2)	Mean	(1)	(2)	Mean	(1)	(2)	Mean
0	3.26	3.23	3.25	1.47	1.42	1.45	4.73	4.65	4.69
1	3.24	3.10	3.17	1.43	1.56	1.50	4.67	4.66	4.67
2	3.59	3.25	3.42	1.50	1.49	1.50	5.09	4.74	4.92
3	3.12	3.18	3.15	1.43	1.62	1.53	4.55	4.80	4.68
5	3.62	3.53	3.58	1.48	1.39	1.44	5.10	4.92	5.01
7	3.78	3.71	3.75	1.04	1.03	1.04	4.82	4.74	4.78
9	4.74	4.75	4.75	0.33	0.38	0.36	5.07	5.13	5.10
12	5.30	5.36	5.33	0.02	0.01	0.02	5.32	5.37	5.35
14	5.50	5.05	5.28	0.01	0.01	0.01	5.51	5.06	5.29
16	5.30	5.40	5.35	0.07	0.06	0.07	5.37	5.46	5.42

A second sample from the same run was kept in a drawer without free access of air to the individual sheets and an analysis after 14 days showed 0.12 per cent rubber. This and the increasing total extract indicate oxidation. The presence of the rubber in finely divided condition and large surface of exposure in the sheet of paper is conducive to relatively rapid oxidation.

A kraft paper and a rag paper (having 1 per cent of rubber in the beater furnish) made during the experiments by Shaw and Bicking, when analyzed for rubber content gave the following results in percentage:

	Fresh	2 months old	6 months old
Kraft .....	0.66	0.12	0.00
Rag .....	0.59	0.43	0.24

Some other papers obtained from abroad gave the following results:

Kind	Stock	Rubber or latex in furnish Per cent	Rubber in paper by analysis Per cent	Age
Tissue.....	Rag .....	0.5 rubber	0.28	Unknown
Tissue.....	Rag .....	1.0 rubber	0.11	Unknown
Newsprint.....	60 per cent coniferous. }	1.0 latex	0.03	Unknown
Coin bag.....	Coniferous .....	3.0 latex	0.11	Unknown
Insulating.....	Coniferous .....	9.0 latex	1.63	Unknown

The rubber content of the latex used in the last three papers was unknown.

Since the rubber is put in the paper with the expectation that it will impart to the paper some of the qualities peculiar to rubber, elasticity in particular, the inference drawn from the fact that the rubber oxidizes to form resinous material is that such added qualities would not be permanent. But the relation of the oxidation of the rubber to the physical qualities of the paper is not to be assumed without further investigation. It is doubtful if changes in physical qualities with oxidation of rubber would be appreciable in the experimental papers containing 3 per cent of rosin, in view of the relatively small influence of rubber latex on the strength of paper, as indicated in the previous report of this bureau to the effect that, although an added quality was given the finish of the paper, no definite improvement in strength was observed in paper to which rosin and latex were added in the beater over that containing rosin alone.

### Conclusions

Successive analyses of the same papers with increasing age indicate a comparatively rapid oxidation of the rubber retained in paper as a result of adding latex to the beater furnish. Within the limits of the investigation the oxidation was observed to be most rapid in the case of paper made of sulphite and soda pulp and least rapid in the case of rag papers. Complete oxidation in the case of the former was a matter of a few days, while in the latter case several months were required for the greater part of the rubber to oxidize.

### THE AUTOMOBILE INDUSTRY IN 1922

That 1922 was a record year for the automobile industry is indicated by statistics prepared in the 1923 edition of "Facts and Figures of the Automobile Industry," published by the National Automobile Chamber of Commerce. According to these tabulations the production in 1922 of 2,659,064\* motor vehicles passed the high mark of 1920 by 22 per cent, and that of 1921 by 60 per cent. The total registration for 1922 of cars and trucks is estimated at 12,239,114, corresponding figures for 1921 being 10,464,005, and for 1920 9,177,129. The number of tire casings produced during the twelve month's period reached 40,930,852, while the value of tire replacements is figured as being \$388,066,000. During this time also the amount of gasoline consumed in the United States totaled 5,382,504,177 gallons, of which motor vehicles are said to have consumed 80 per cent.

### 1922 Tire Production

Tire casings .....	30,698,139†
Inner tubes .....	38,137,435†
Solid tires .....	786,603††
Crude rubber consumed in 1921 tire production, pounds..	523,526,219
Fabrics consumed, pounds.....	178,049,206

\*Following the classification used in previous editions of "Facts and Figures," this total includes motor vehicles made in Canada but in plants controlled by United States companies. The net production figure for motor vehicles made in the United States is 2,561,000.

†Estimated from figures compiled by The Rubber Association of America, and considering their figures as representing 75 per cent of the total.

††Representing 90 per cent of the total.

### SUCTION HOSE USEFUL IN CONVEYING INSTALLATIONS

Pneumatic conveying installations are particularly desirable when material such as soda ash, fertilizer, dolomite, etc., must be handled or unloaded from box cars to elevators.

One well-known conveying company illustrates in its circulars one of its larger installations where 30 feet of rubber suction hose are required. Two 3-inch sizes of such hose are used for this especial process, instead of one 4-inch size, and by means of such equipment 20 tons an hour of material are lifted by electricity 72 feet and then carried a horizontal distance of 42 feet. In a smaller installation one 2½-inch hose about 25 feet in length is used in pulling from six to eight tons of material per hour out of box cars and carrying it a short distance.

# Rubber Growing in the Guianas and Trinidad

Here Rubber Could Be Produced by Application of Capital, Initiative and Intelligence

THAT the Guianas—British, Dutch and French—located in tropical South America, are well adapted to the cultivation of Pará rubber, has been adequately shown by numerous successful plantation experiments there which have been described in THE INDIA RUBBER WORLD.<sup>1</sup> The same is true of the British island of Trinidad<sup>2</sup> and Tobago, off the coast of Venezuela. Owing to various difficulties, rubber cultivation in these colonies has languished and there have been no recent plantation extensions. From the beginnings made, however, a considerable rubber producing industry might be built up by the application of capital, initiative and intelligence.

The three well-governed Guiana colonies, only a week's sail from New York, are traversed by numerous navigable rivers and smaller streams and comprise about 180,000 square miles, an area somewhat greater than the states of Pennsylvania, Ohio, Indiana and Illinois. In the vast forests of this region, just over the Tumac-Humac mountains from the original habitat of the *Hevea brasiliensis*, the *Sapium Jenmani*, and a species of *Hevea* known as the *Guayanensis* as well as *balata* flourish naturally, indicating the suitability of the region to rubber growing.

Next door to Brazil, humid, tropical, and with a long and short wet season, the Guianas are in climate, soil, fauna and flora northern Brazil over again. As tropical countries go, the climate is not unhealthful, and all common diseases are preventable by intelligent precautions. Hurricanes are unknown, tidal waves impossible, and earthquakes practically harmless. The temperature is uniform on the coast from October to July, the prevailing northeast trade winds keeping it down to an average of 80 degrees F. In August and September the trade winds die away and the heat becomes somewhat oppressive. In the interior the nights are cold and damp.

Usually the year is clearly divided into two wet and two dry seasons—a long and a short dry season, and a period of heavy and of slight rainfall. The long wet season begins in mid-April and lasts until mid-August. The long dry season is from September to the last of November. December and January constitute the short rainy season, and February and March the short dry season. The rainfall varies greatly in different localities, the average on the coast being about 80 inches annually and in the interior much greater.

Of the three Guianas, British and Dutch have done most with rubber culture. While soil and climate are perhaps as favorable in French Guiana, labor shortage and lack of adequate communications have been drawbacks.

## British Guiana

In this progressive and well-governed British colony, rich in every tropical product, the climate is ideal for rubber growing. It is hot but not torrid, with the trade winds the year round making cool nights. The rainfall is all that could be desired for rubber planting. It is well distributed and can be had in almost any desired quantity according to the location chosen. It varies from 92 inches on the Essequibo river to 268 inches in the northwest district. At the Botanic Gardens, Georgetown, the rainfall for the 53 years up to 1915 averaged 93.88 inches annually. At "The Hills" plantation on the Mazaruni river the average rainfall for the five years from 1908 to 1913 was 103 inches.

Hevea growth has been satisfactory wherever plantings have been made on suitable land. Four-year trees average 11 to 17

inches in girth at 3 feet from the ground; 8-year trees, 24 to 25 inches; 12-year trees, 35½ inches; 15-year trees, 45½ inches.

The average yields of dry rubber from 5 to 8-year trees range from 2¼ to 3¾ pounds per tree annually and the rubber has brought the highest prices. Both yield and quality compare favorably with those obtained in the East. Samples sent to the Imperial Institute in London, England, in 1914, from 4¼ to 5-year trees varied from light to reddish brown in color and contained over 95 per cent of caoutchouc with only 2 per cent of resin, the loss on washing being only 1 per cent. The rubber was not quite so strong as from older trees.

The plantations have suffered to a certain extent from diseases, the South American leaf disease (*Fusicladium macrosporum*) having been the most prevalent. Brown root disease (*Hymenochaete noxia*) and die-back (*Thyridaria tarda*) also attacked the trees. Root disease (*Fomes semitostus*), well known in the East, was observed here for the first time in 1915, but in recent years



Tapping 5-Year Old Hevea, Bartica Estate, British Guiana, 1916

a marked improvement in the condition of the trees has been observed.

As early as 1895 the first seeds of *Hevea brasiliensis* were brought into British Guiana and the resulting plants later sent to different parts of the colony. In 1905 the Botanic Gardens in Georgetown began to import Hevea seeds in earnest and six years later had raised and sold nearly 200,000 seedlings to planters, about 1,000 acres being planted at a cost of \$70 per acre the first year for drained lands and thereafter \$25 per year for upkeep. On higher land the initial cost was \$48 per acre.

Land was cleared and several thousand Heveas planted at government experiment stations in every variety of soil, a careful record of growth and yield having been kept which furnishes a remarkable fund of exact information to draw from before selecting land and putting in seed. These experiments established the fact that the upper reaches of the great rivers and the interior forest lands are well adapted for Pará cultivation, and have provided an adequate local seed supply.

At the time the Editor of THE INDIA RUBBER WORLD visited British Guiana in 1910, and for several years afterward, seeds were imported extensively from Ceylon and the Straits Settlements and seedlings distributed to planters from the Botanic Gardens in Georgetown.

In 1916 the area under rubber cultivation had reached 4,844 acres, mostly in the districts of Demerara, Essequibo and Berbice, named in their order of importance. Rubber exports in 1916

<sup>1</sup> THE INDIA RUBBER WORLD, January 1, 1911, 115; June 1, 1911, 299; January 1, 1914, 211; February 1, 1914, 272; June 1, 1916, 508.

<sup>2</sup> THE INDIA RUBBER WORLD, July 1, 1912, 471; September 1, 1912, 571.

totaled only 15,570 pounds, as tapping had only just begun on most plantations. Up to the critical stage of the war, rubber planting progressed slowly but steadily despite the many disappointments usually experienced in new ventures in tropical agriculture, but planters have not extended their area owing to the rubber surplus from the East and the consequent slump in prices.

With an area of 104,000 square miles, a country as large as England, Scotland, Wales, and half of Ireland, at least 11,000,000 of its over 66,000,000 acres are easily accessible for tropical agriculture. Rail and river communication are more extensive than in the other Guianas, though like them the colony is sparsely populated. Of its some 300,000 inhabitants one-third are East Indians and one-third negroes.

### Dutch Guiana

Dutch Guiana was late and slow to enter this field, but rubber growing there has now passed the experimental stage and the foundation of a substantial industry has been laid. What is now required is adequate capital and the necessary labor to place the undertaking on a firm basis. During the war, tapping operations practically ceased, owing to lack of market and strict rubber export regulations, but the plantations should now be able to compete with the best anywhere. It is estimated that only a small portion of the possible rubber supply of Dutch Guiana has been gathered.

It has been shown that climate and soil are well adapted to rubber culture, and that plantations rightly started and managed should prove a good investment. Dutch Guiana is neither ex-



Tapping 7-Year Old Hevea, Surinam, Dutch Guiana, 1914

ceedingly hot nor unhealthy, as commonly supposed by Americans. The temperature is very even and varies from 70 to 93 degrees. It is warm and humid but never unbearably so.

Like the other Guianas, Surinam is sparsely populated. For estate labor planters are dependent on Tamil and Javanese coolies brought from India and Java on a 5-year indenture contract. They make excellent workers at 40 cents a day. The chief problem is that of skilled tappers. The relatively few experienced Javanese in the colony are in great demand, and promotion of the rubber industry would require further immigration. Collecting latex costs 7 cents per pound of dry rubber in Dutch Guiana, and experience in the East shows the cost of tapping to be half the total expense.

Just as the tea planters in Ceylon turned to rubber while tea was still profitable, so the cocoa planters in Surinam turned to Hevea planting. When the Editor of *THE INDIA RUBBER WORLD* visited Surinam in 1910, many well drained cocoa plantations on

clayey alluvial soil were being converted or partly converted to rubber, as the witch broom disease was beginning seriously to reduce the returns from this ordinarily profitable crop, and the Panama and kindred diseases were attacking bananas. Some coffee and sugar estates were also trying some rubber, and many new estates were being planted about 100 Heveas to the acre with bananas between them. While the trees grow fairly well on undrained land, their growth is much more rapid on drained land. Plantings were made along the edges of broad dykes, twelve feet or so wide, between which ran drainage ditches three to six feet deep.

Strangely enough, with untold Hevea seeds rotting on the ground in Guiana's near neighbor, Brazil, most of the seed used has been imported from the East, with varying success. Frequent shipments of 20,000 to 1,000,000 at a cost of about one cent each delivered were made during the active planting years a decade or more ago, anywhere from 5 to 95 per cent germinating. In 1910 alone private planters with the aid of the Botanical Station imported over one million Hevea seeds, mostly from Ceylon. Probably not over 35 per cent of them germinated, but Surinam is now able to supply seeds and stumps from her own trees.

Following the early failures with Hevea seeds, it was thought that better success might be had with stumps. The Botanical Department therefore imported 80,000 from Ceylon, but from them secured only 4,000 trees. Later it was learned that 50 to 80 per cent of the imported seeds which arrived in September, October and November were saved, but only 15 per cent of those arriving in February, March and April. Thereafter planting operations were more successful.

Once started the growth of the trees was good. At the Botanical Garden 4-year trees averaged 8 inches in diameter 3 feet from the ground. On the Waterland estate 8-year trees averaged 31½ inches in circumference, 12-year trees ranged from 35½ to 39½ inches in circumference 3 feet from the ground.

In 1897 nine Hevea trees, the first cultivated in Surinam, were grown on the Waterland estate from 100 seeds brought from London. Four years later certain other estates planted Hevea stumps secured from the Botanic Gardens. These came from seeds imported directly from Brazil. In 1905 there were 15,000 planted trees in the colony, the largest planting being 9,000 at Voorberg and 1,000 at Wederzorg. In 1910 thirty-six estates had 165,000 Hevea trees growing.

Meanwhile, the government, realizing the colony's opportunity as a rubber producer, purchased Sloopwijk, an old 1,200-acre cocoa plantation on the Commewyne river, and began planting Heveas on a large scale. The trees, about 100 to the acre, were interplanted with cocoa, coffee and bananas, stumps 1½ to 2 years old furnished by the Botanic Gardens being used.

In 1905 experimental tapping was begun on the Waterland trees and in 1909 eight of the first ones, tapped every other day, averaged for the year some 2.4 pounds of dry rubber and 0.6 pounds of scrap per tree. The latex contained about 30 per cent of rubber of excellent quality. The average plantation yield in Guiana has been rather better than this.

At last reports La Liberte, with over 280,000 trees, and Accarico, with over 120,000 trees, were the largest plantations, although Voorberg, Clevia, Neuwe Grond and Clarenbeek were among the first to begin marketing rubber. The South American leaf disease, which gave some concern in 1916 and 1917, but yielded to spraying, appears to have entirely disappeared and no new serious insect pests have been remarked. The trees on most estates are healthy, robust, and of a size comparable with any of the long-established estates of the East.

### Trinidad

Trinidad, with an area of 1,754 square miles, or almost the size of Delaware, is a great center for tropical products, and rubber grows there as well as cocoa. A large population, about

one-third East Indians, and excellent communications, including 90 miles of railroad, 400 miles of improved highway and 1,100 miles of ordinary roads, are largely responsible for the island's prosperity.

Soil and climate are much like the nearby mainland, of which it was probably once a part. Trinidad is hot, with a mean tem-



Tapping 13-Year Old Hevea, Trinidad, 1912

perature of about 78° Fahrenheit and an annual rainfall of 66½ inches. Hurricanes are unknown. The wet and dry seasons and the trade winds correspond to those in Guiana.

Of rubber there are a few quite sizeable plantings and hundreds that run from half a dozen trees up to several thousand. Ceara, Funtumia, Castillea and Ficus have all been tried, but Hevea does best, flourishing not only in the moist districts but in places thought too dry for cocoa. Trees at St. Clair yielded an average of 3½ to 4½ pounds during seven years when the average rainfall was only 56½ inches. At the St. Clair Experiment Station in 1911 13-year trees varying in girth from 20¾ to 36¼ inches yielded from 14.52 ounces to 6 pounds, 4.63 ounces in six months. Up to 1912, however, over 500,000 Castillea trees had been planted, as against 100,000 Heveas. No leaf or other disease or pest has appeared up to 1918, although some trouble, soon overcome, had been occasioned by cross pollenization with *Hevea Confusa*, the resulting hybrid yielding a very short latex of inferior quality.

The report of a special investigating committee of the Board of Agriculture shows the condition of rubber cultivation in Trinidad and Tobago at the beginning of 1917, since which little progress has been made.

On the 52 out of 155 estates furnishing information to the committee, there were altogether about 250,000 trees, of which 130,593 were Hevea, 81,975 Castillea, and 95,000 Funtumia. Figures from the other 103 estates would raise these totals.

Lack of perseverance on the part of the planters is responsible for the fact that, excepting in Manzanilla, no headway has been made. Most rubber areas have been neglected and present a very poor appearance, but since much capital has been sunk in various districts the great problem is the possibility of realizing any returns on the capital invested.

Exports of rubber in 1920 were 39,517 pounds, 16,000 trees being tapped on one estate. Many Castillea trees have been cut down because the yield was less than expected.

"Rubber Machinery," by Henry C. Pearson, should be in the library of every rubber company.

### IMPACT TESTS OF TRUCK TIRES

The investigations now being carried forward by the United States Bureau of Public Roads at the Arlington, Virginia, Experiment Station include the structural design of roads, road materials, and impact conditions produced by motor trucks on road surfaces. The following conclusions have been drawn from these investigations:

Impact depends largely upon the kind and condition of the tire.

Thin or worn solid rubber tires, even though they be very wide, produce very high impact forces.

Pneumatic tires offer the greatest influence in reducing impact forces, and with their use the impact increases only very slightly with the speed of the truck.

Cushion tires, that is, tires having a degree of softness and deflection between solids and pneumatics, offer corresponding advantages in reducing impact.

Impact increases with the speed of the truck, but it cannot be said to increase according to any constant ratio or power of the speed.

Although heavy unsprung weight may give higher impact than lighter unsprung weight, it cannot be said that this is the major controlling factor.

The relative destructive effect produced by light weight, high speed trucks and heavy, slow-moving trucks has not been determined by these tests. They do, however, indicate that equal impact may be obtained under some conditions.

Impact may be as high as 7 times the static load on one rear wheel when a solid tire truck strikes a 1-inch obstruction at 16 miles per hour, an average value being about 4 times. For pneumatic tires the maximum impact value is probably not more than 1¾ times the load at one rear wheel, and an average value is not more than 1¼ times the load.

All cushion wheels do not reduce impact on the road surface even though they may cushion the vehicle.

### ANALOGY BETWEEN RUBBER AND STEEL<sup>1</sup>

An interesting analogy exists between rubber and steel. Compare their tensile strength. A high grade rubber compound possesses a tensile of 36,000 pounds per square inch if computed upon the area of cross section at break. (See Wiegand in January INDIA RUBBER WORLD, p. 224.) A good steel has a tensile of 72,000 pounds.

Steel, as well as rubber, originates from a moderately plastic material, pure iron, but the addition of another element, together with heat, brings about a remarkable change in each of these materials. Caoutchouc becomes rubber and iron becomes steel. In one case the change was caused by two or three per cent of sulphur and in the other two or three-tenths per cent of carbon. The first process is called vulcanization, and the second the Bessemer or open hearth process.

Again, both steel and rubber require the addition of other substances to give them various desired properties. For instance, the addition of tungsten makes steel tough, while zinc oxide makes rubber tough. Likewise, each has its fatal enemies. What sulphur and phosphorus are to steel, copper and manganese are to rubber.

Both rubber and steel are remarkably resistant to abrasion. Does not the rubber tire doing its bit of 25,000 miles or so approach the class of its steely competitor?

<sup>1</sup>By A. E. Plumb, assistant chemist, Continental Rubber Co.

### SOUTH INDIAN EXPORTS

During 1922, South India exported 6,725,646 pounds of rubber. Of this 1,067,918 pounds went to other parts of India, 1,595,634 pounds went to Ceylon; 2,798,621 pounds to England; 161,999 pounds to Europe, and 1,101,474 pounds to America.

## Abrasion Testing

By Harlan A. Depew

THE abrasion testing machine developed by Harlan A. Depew, recently described,<sup>1</sup> is well adapted for determining the relative resistance to abrasion of tire treads, sole and heel stocks, etc. The method of test and some of the results reported in the original paper by Mr. Depew<sup>2</sup> are here given, somewhat condensed.

### Details of Test

Three specimens and a standard are weighed. These are placed in the four holders of the machine, the suction is started, the reading of the counter is noted, and the track set in motion. Every 500 revolutions the track is stopped and brushed thoroughly to remove any loose abraded rubber which the rotating brushes and the suction have failed to remove. When the rubber slabs are worn from half to two-thirds through they are removed from the holders and weighed again.

### Standard Test Compound

The standard test compound which is cured 90 minutes at 141 degrees C. in a press is as follows:

	Parts
First latex crepe .....	920
Sulphur .....	920
Hexamethylene tetramine .....	55
Zinc oxide "XX Red" .....	1,260

An arbitrary value of 115 has been given as the resistance to wear of this compound.

### Sample Data

Specimen	Minutes Cure	Specific Gravity	Number of Revolutions	Original Weight	Final Weight	Loss in Weight	Loss in Wt. per 1,000 Revs.	Volume Loss per 1,000 Revs.	Abrasion Index
Standard	90	1.78	1,000	46.22	36.52	9.70	9.70	5.45	115
No. 13...	90	1.77	1,000	45.98	33.58	12.40	12.40	7.00	90
No. 42...	90	1.63	1,000	41.80	34.93	6.87	6.87	4.22	148
No. 13...	105	1.77	1,000	44.17	34.06	10.11	10.11	5.71	110
Standard	90	1.78	1,120	48.18	37.21	10.97	9.78	5.49	115
No. 13...	105	1.77	1,120	45.30	32.47	12.83	11.45	6.48	98
No. 54...	120	1.76	1,120	43.00	35.78	7.22	6.43	3.65	173
No. 13...	120	1.77	1,120	39.48	28.15	11.33	10.13	5.73	110

### Influence of Speed and Pressure

The test is not entirely independent of the number of revolutions of the track, as shown by the following tabulation:

Number of Revolutions	A	B
200 .....	105	146
400 .....	106	153
800 .....	108	160
1,200 .....	112	162
1,600 .....	112	167

The resistance to wear is only affected to a small extent by the number of revolutions if the wheel makes at least 800 revolutions. Accordingly the wheel is usually run from 1,000 to 2,000 revolutions.

### Effect of Pressure on Wear

The volume abraded depends upon the pressure on the test piece. The effective weights of the holders must all be the same. As a check the wheel should be run with standards on all four holders, and the weights and angles of the arms adjusted until all four test pieces abrade alike. Since the weight of the holder is about 3.2 pounds and the area 4 square inches, the pressure is about 0.8 pounds per square inch. The pressure on a pneumatic tire tread is roughly proportional to the inflation pressure, or from

30 to 90 pounds. The pressure on a solid tire is often many times greater. There is accordingly no relationship between road conditions and experimental conditions in so far as pressure on the rubber is concerned.

A few tests in which the pressure on the holder was varied gave increasing wear as the load increased. Relative volume loss when test pieces are abraded at varying degrees of pressure is shown below.

Pressure—Lbs. per Sq. In.	0.9 Lbs.	2.3 Lbs.	3.5 Lbs.
Relative Volume Loss			
Test Compound No. 1.....	1.21	3.92	6.09
Test Compound No. 2.....	0.93	3.19	5.77
Test Compound No. 3.....	0.27	0.80	1.49

The results show that the wear loss increases more rapidly than the pressure. However, the relationship between the volume loss and pressure is sufficiently near linear so that there is no serious error in choosing an arbitrary pressure and so that small variations in the area of the abraded sample will not make a serious error. It is very important, however, that the sample should be clamped squarely in the holder. If this is not done, the abraded area will not be a square, and the results will be irregular.

### Comparison of Abrasion Machine Tests with Road Tests

The final test of any abrasion machine is a comparison of the machine tests with service tests. A considerable number of service tests have checked the laboratory tests remarkably close. A typical example is a tire built with two tread sections of different composition. The relative abrasion resistances determined from the volume of tread abraded away was 100 and 175. The corresponding values for slabs of the same compositions tested on the abrasion machine were 100 and 164.

The abrasion test by itself is not applicable for heel compounds of widely differing types. The abrasion resistance considered in connection with the hardness, or the load at 150 per cent elongation, will enable an investigator to appraise a compound with fair reliability.

The area under the stress-strain curve is also of help in grading these compounds. It fails, however, as an exact guide.

### Comparison with the Loose Abrasive Method

The loose abrasive method described by Sproull and Evans is being used by some investigators. In this method rubber test pieces in the form of rings are rotated several hours in loose carborundum. The volume losses are determined and the resistance to wear is calculated.

In order to compare the loose abrasive method with that described above, sheets of rubber were vulcanized and cut in two pieces, which were tested on the two machines. Abrasion resistances obtained on the abrasion wheel contrasted with the loose abrasive method are here given:

Compound	Time, Min.	Cure, Degrees C.	Abrasion Wheel	Loose Abrasive
A.....	75	141	106	108
A.....	105	141	120	120
A.....	120	141	129	132
B.....	30	141	181	222
B.....	45	141	260	344
B.....	60	141	283	322

The two methods, so far as this test shows, check qualitatively but it is apparent that the loose abrasive gives a wider spread between two samples of different abrasive resistance. If the two machines are considered calibrated by the above data there is no reason to believe that the figures from one would not check with those from the other.

<sup>1</sup> THE INDIA RUBBER WORLD, March 1, 1923, 357.

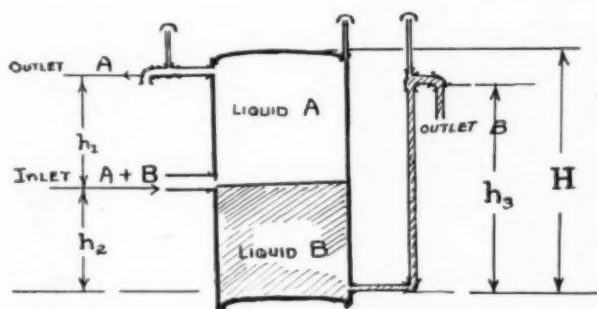
<sup>2</sup> Bulletin, Research Department, New Jersey Zinc Co., Palmerton, Pennsylvania.

# What the Rubber Chemists Are Doing

## Gravity Separation of Non-miscible Liquids

By Thomas M. Knowland

IN plants where the various solvents are used in quantity, it is frequently necessary to make up from material on hand apparatus for separating from water condenser mixtures of benzol, benzine, toluene, etc. This is readily accomplished by using a spare tank or section of large diameter pipe and locating the inlets and vents in accordance with the following sketch.



H—Height of tank.  $h_1$ —Height heavy liquid leg.  $h_2$ —Height light liquid.  $h_3$ —Heavy liquid. Gr. Specific Gravity.

### Gravity Separation Apparatus

The mixture inlet should be located at the center of the tank and the outlets so designed as to maintain the separating film at this same level. If this is done, equal space is provided for the two components to separate them from each other. Assuming that it is desired to separate a condensed mixture of liquids A and B, the following formula is used:

$$h_3 (\text{Gr. B}) = h_1 (\text{Gr. A}) + h_2 (\text{Gr. B})$$

$$\text{where } h_1 = h_2 = \frac{H}{2}$$

$$\therefore h_3 = \frac{H (\text{Gr. A} + \text{Gr. B})}{(2 \text{ Gr. B})}$$

Outlet for the lighter liquid A should be at the top of the tank and overflow for B at the bottom for maximum capacity. Both outlets should be of sufficient diameter to minimize resistance to flow and should be vented as shown to prevent siphon action. The heavy liquid leg is usually located inside the tank.

It is very important that the diameter of outlet B be sufficiently large to cut down flow resistance, since this will obviously force the separating film toward the top of the tank. This displacement effect increases rapidly with liquids which approach the same gravity, and for water and benzol amounts to an 8.3 fold displacement for each unit head increase in tank pressure. It can be calculated as follows:

$$\text{Film displacement } h = \frac{\text{Gr. B}}{\text{Gr. B} - \text{Gr. A}} \text{ (in. H}_2\text{O back pressure)}$$

It will be seen that for liquids approaching the same gravity the adjustment is more critical and a deeper tank must be used to allow time for separation. So far as capacity is concerned it is important to have a relatively large volume or diameter tank, since efficiency of separation depends largely on freedom from agitation due to the inlet stream. This is a factor which must receive special attention with each problem of separation, since it involves not only the gravity of the liquids but their relative emulsification properties.

## Plantation Rubber Quality

By O. de Vries<sup>1</sup>

The questionnaire proposed by Dr. O. de Vries on the occasion of his visit to America in 1921 sought to develop definite information on the working qualities desired by American rubber manufacturers and their chemists. The conclusions drawn by Dr. de Vries from the replies received are indicated by his summary under the following headings.

### Rate of Cure

As to variability in rate of cure it is pretty clear that the present state of affairs is satisfactory for the majority of rubber articles. In case variability-proof mixtures are developed, care to ensure greater uniformity in the preparation on the estates would become superfluous.

For purposes for which uniformity in the rate of cure is of importance, special supplies from selected estates which prepare their rubber after the best known standard methods, regularly controlled by outside authority, would seem to deserve more attention than formerly.

### Testing Mixtures

Special factory tests are of limited use for determining if a given rubber is suitable for use in a certain mixture and do not interest general testing stations. The purpose of general tests is to put into figures as many distinctive properties of the rubber as possible so that one can at once decide whether it has the combination of properties desired for any application.

Our present knowledge of rubber testing is still very incomplete and gives us only an insight in certain groups of properties we know. For example, the pure rubber sulphur mixture is very suitable to detect differences in rate of cure, but we do not know how to determine hardness on the mills, plasticity, flowing properties, etc. Formulas at present given seem to be more or less leaps in the dark and our knowledge of why they should be used and what they teach seems to be very insufficient. Further research will undoubtedly show the way.

### Tensile Strength

No trouble is experienced with tensile strength. There is very little interest for higher figures and all find tensile strength sufficient for practical purposes.

### Plasticity

The opinion that plantation rubber is very variable in stiffness or plasticity and should, if possible, be softer than at present, has been so repeatedly and strongly voiced that due attention will surely be paid to it. Heretofore this point has been neglected. Manufacturers might help much by studying under scientifically controlled conditions methods for testing for such properties as stiffness, heating up on the mills, plasticity, tackiness or dryness after milling, etc. Only when definite wishes are expressed by manufacturers have plantations an aim toward which to work.

While the desideratum of a more uniform and more plastic plantation rubber will receive due attention, we may expect that with plasticity the history of rate of cure will repeat itself to some extent. Manufacturers learned to control vulcanization more systematically and to understand rate of cure scientifically, and this took away much of the trouble. They then learned to avoid trouble with variability by using accelerators. Manufacturers will learn to understand and test plasticity and similar properties scientifically and will learn to control masticating and calendering in a better way than at present. Much of the trouble will then disappear.

<sup>1</sup> Director of the Central Rubber Station, Buitenzorg, Java.

### Special Types

On the properties of special types such as Brazilian Hard Fine, slab rubber, etc., no important new light is thrown by the answers.

## Thermal Properties of Various Pigments and of Rubber<sup>1</sup>

By Ira Williams<sup>2</sup>

The following abstract outlines the author's paper:

Hot vulcanization requires careful temperature control. If the article to be cured is in the form of a thin sheet, it is usually sufficient to control the temperature of the heater or press. In the case of bulky articles, such control is not sufficient. Vulcanization is a function of both temperature and time, and this time-temperature relation at the center of a bulky object cannot be controlled to advantage without a knowledge of diffusivities. A knowledge of conductivity is also useful in studying temperatures produced, due to hysteresis loss in tires during use.

Two separate methods were used for the determination of thermal conductivities. One of the methods gave the conductivity directly, while the second gave values for the diffusivity.

### Method I

A cell method was used for the direct determination of conductivity of the stock examined. This consisted essentially in covering a closed cylindrical vessel with the material to be studied and measuring the water which collects when steam is passed through the vessel, the temperature of the outside being controlled by immersion in a constant temperature bath.

### Method II

The second method involves the determination of the diffusivity constant from which conductivity may be calculated. The method follows the work of Williamson and Adams,<sup>3</sup> and consists in measuring the temperature rise at the center of a cylinder when the surface is subjected to a uniform temperature. The stock to be studied is first calendered thin and a uniform cylinder obtained by rolling it to the desired size. Before rolling the sheet into a cylinder, a thermocouple was placed at the edge so that it would be rolled into the center of the cylinder. The cylinders measuring  $\frac{3}{4}$  to 1 inch in diameter were wrapped in aluminum foil and immersed in boiling water. The temperature was recorded by the use of a potentiometer.

### Charting Thermal Conductivity Values

Should the conductivity of a stock be an additive property, as the filler is varied we should obtain a curve of volume per cent

plotted against conductivity, which is a straight line between the value for the conductivity of rubber and the value for the pigment used. Since the values for the different pigments are not known, we must obtain the curve by varying the amount of filler in the compound. Once the curves are established as straight lines, the values for the conductivity of the pigment may be obtained by extrapolation. The curves assume straight lines.

In the following table the values for the conductivity of the different pigments were obtained by extrapolation. The values for the specific heat were taken from the Landolt and Börnstein tables, with the exception of the specific heat of rubber and gas black, which was determined in this laboratory.

### Calculation of Thermal Conductivity and Diffusivity of a Rubber Mixing

Since thermal conductivity is an additive property and depends upon the volume per cent, the calculation of the value of the conductivity constant is extremely simple. It is only necessary to take the sum of the volume per cent of each material times its conductivity. Let us illustrate with a compound containing smoked sheet, zinc oxide, and gas black. Multiply each per cent, expressed as hundredths, by the conductivity of the corresponding pigment, and take the sum as follows:

PIGMENT	Volume Per cent	Conductivity	Conductivity X Volume
Smoked sheet.....	70	0.00032	0.000224
Zinc oxide .....	15	0.00166	0.000249
Gas black .....	15	0.00067	0.000100
TOTAL .....			0.000573

The total is the conductivity coefficient in calories per cubic centimeter per second. An actual determination of this stock by the cell method gives the value 0.000572, which is even closer agreement than can be expected in most cases.

The diffusivity cannot be calculated in this manner, but must be

K

found by the relation  $k = \frac{K}{\text{specific heat} \times \text{sp. gr.}}$ . Taking

values from Table I the specific heat of the compound is found as follows:

PIGMENT	Per cent by Weight	Specific Heat	
Smoked sheet.....	0.365	X 0.502	= 0.183
Zinc oxide .....	0.465	X 0.125	= 0.058
Gas black .....	0.17	X 0.204	= 0.035
TOTAL .....			0.276

The specific heat is then 0.276 cal. per g. per degree C. The gravity is found by calculation to be 1.76 and by substitution in the formula, the diffusivity constant

$$0.000573$$

$$k = \frac{0.000573}{0.276 \times 1.76} = 0.00118$$

$$0.276 \times 1.76$$

## Chemical Patents The United States

**VULCANIZED RUBBER SOLUTION AND PROCESS.** A process of making a solution capable of passing through parchment, which consists in digesting a mixture of crude rubber and sulphur and a solvent at an elevated temperature.—William B. Pratt, Wellesley Hills, assignor to E. H. Clapp Rubber Co., Boston, both in Massachusetts. United States patent No. 1,451,711.

## The Dominion of Canada

**PROCESS OF TREATING RUBBER** with specially prepared accelerators. The stearic acid addition product of tri-ethyl—tri-methylene—tri-amine is referred to.—The Canadian Consolidated Rubber Co., Limited, Montreal, Canada, assignee of Charles E. Bradley, Montclair, and Sidney M. Cadwell, Leonia, both in New Jersey. Canadian patent No. 229,671.

Table I

### Diffusivity and Conductivity Values

PIGMENT	Specific Gravity	Specific Heat	Diffusivity 45°-100° C.	Conductivity 45°-100° C.	METHOD OF DETERMINATION
Zinc oxide.....	5.50	0.125	0.00241	0.00166	Cylinder and cell
Sulphur .....	2.00	0.175	0.00034	0.00012	
Whiting .....	2.63	0.201	0.00156	0.00084	
Litharge .....	9.25	0.052	0.00106	0.00051	Cylinder
Lithopone .....	3.95	0.115	0.00207	0.00094	
Talc .....	2.70	0.209	0.00116	0.00058	
Antimony sulphide <sup>4</sup> .	3.20	0.085	0.00077	0.00021	Cylinder and cell
Red oxide.....	4.70	0.166	0.00175	0.00132	
Gas black.....	2.00	0.204	0.00164	0.00067	
Blanc fixe .....	4.35	0.114	0.00157	0.00078	Cylinder and cell
Dixie clay.....	2.66	0.200	0.00112	0.00058	
Magnesium carbonate	3.00	0.303	0.00114	0.00103	
Rubber, smoked sheet, pale crepe, etc., including cured rubber .....	0.92	0.502	0.00069	0.00032	Cylinder and cell
Cord fabric <sup>5</sup> approximate .....	1.30	0.324	0.00168	0.00082	

<sup>1</sup>Presented before the Rubber Division at the 63rd meeting of the American Chemical Society, Birmingham, Alabama, April 3 to 7, 1922.

<sup>2</sup>Research Laboratories, Firestone Tire & Rubber Co., Akron, Ohio.

<sup>3</sup>Physical Review, 14, 1919, 99.

<sup>4</sup>Contained 15.6 per cent free sulphur.

<sup>5</sup>Value calculated from determinations made on fractional fabric.

### The United Kingdom

**RUBBER COMPOSITIONS.** Compounding ingredients are mixed with latex to which has been added an agent to prevent premature coagulation and the mixture is agitated to secure homogeneity.—E. Hopkinson, 1790 Broadway, New York, N. Y. British patent No. 193,044.

**RUBBER SURFACED ARTICLES.** A vulcanizing rubber-containing coating containing fibers is applied to the surface of articles of wood, stone, cement, etc. The invention is particularly applicable to the manufacture of rubber surfaced wood paving blocks.—W. Baines, 9 Fishergate Hill, Preston, England. British patent No. 193,137.

**VULCANIZING LATEX.** A solution of colloid suspension of vulcanized rubber in water is obtained by submitting latex to vulcanization with sulphur or the like under such conditions that coagulation is precluded. The latex must be rendered alkaline to inhibit coagulation by the addition of alkali as ammonia or a base as piperidine, or by the use of a vulcanizing agent such as an alkaline polysulphide. Coagulation may also be prevented by dilution of the latex or by the addition of a colloid, as casein, which also renders the final product less liable to be tacky. Fillers, dyes, etc., may be added at any stage. Vulcanization can be effected in half an hour rise to 40 pounds and continuing half an hour at 40 pounds.—P. Schidrowitz, 57 Chancery Lane, London. British patent No. 193,451.

**MICA, ASBESTOS AND RUBBER COMPOSITIONS.** Residues of mica, asbestos, talc and similar silicates are converted into the colloid state in a colloid mill. The colloid solution is subjected to ultra-filtration, dried in vacua and molded under pressure. Fillers or binding agents such as rubber, resins, drying oils, olein and clay may be added to the silicate either before or after disintegration.—Plauson's, Ltd., 17 Waterloo Place, Pall Mall, London. British patent No. 193,520.

**RUBBER AND ARTIFICIAL RESIN COMPOSITIONS.** Solid or liquid compositions containing rubber and synthetic resins are obtained by homogenizing the substances in the presence of a liquid which exerts a solvent of swelling action upon both ingredients. The preferred liquids are chlorhydrin, cyclohexanol, and a mixture of these. Homogenization is effected in a colloid mill. The dried products are cured in molds with heat.—Plauson's, Ltd., 17 Waterloo Place, Pall Mall, London. British patent No. 193,524.

### New Zealand

**RUBBER MANUFACTURE.** Same specification as noted in British patent No. 193,451.

### Germany

#### Patents Issued with Dates of Issue

- 374,249 (March 31, 1921). Method for recovering volatile, easily combustible solvents from textile fabrics. The Dunlop Rubber Co., Limited, Birmingham, England; represented by: B. Tolksdorf, Berlin W. 9.
- 374,322 (July 30, 1921). Method for making plastic masses. Farbwerke vormals Meister Lucius & Brüning, Höchst-am-Main.
- 375,639 (October 4, 1918). Method for making masses like gutta percha. Felten & Guillaume Carlswerk A.-G., Köln-Mülheim.
- 375,640 (October 21, 1919). Method for making viscous solutions or plastic masses from acetylcellulose. Dr. Fritz Pollak, G. m. b. H., Berlin.
- 375,641 (October 21, 1919). Method for making viscous solutions or dough-like masses from acetylcellulose. Dr. Fritz Pollak, G. m. b. H., Berlin.
- 375,776 (September 2, 1922). Method for making an accelerator for vulcanizing. Dr. Werner Esch, Mühlenkamp 5, Hamburg.

### CHINN MINERAL

A pure calcium carbonate mined in Kentucky is prepared for use as an inert rubber compounding ingredient and offered under the brand name of Chinn mineral. It is snow white in color and has a specific gravity of 2.64.

### MEETING OF CRUDE RUBBER COMMITTEE, RUBBER DIVISION, A. C. S.

A meeting of the Crude Rubber Committee of the Rubber Division, American Chemical Society, was held at the Chemists' Club, in New York City, May 8, 1923. All of the active members were present and the work of the committee was planned and organized.

As a compound to test for variation of rate of cure, the pure gum stock—100 rubber and 10 sulphur—was adopted. For the evaluation of quality a formula containing 3 per cent sulphur, 30 per cent zinc oxide to 100 of rubber, and accelerated with hexamethylene tetramine, was tentatively decided upon.

M. P. Rose will take up the development of a break down and a swelling test. Dr. E. A. Van Valkenburgh will work on viscosity determinations, and determine the value of the zinc oxide—hexamethylene tetramine stock for test purposes. C. W. Sanderson will investigate the matter of selecting the most significant physical measurements for cure criteria, using the pure gum test formula. D. F. Cranor will undertake to determine the relation between variation of different lots as shown in the pure gum mix, compared with the action of the same rubbers in certain practical accelerated mixings. The committee expects to have a definite report for the fall meeting of the American Chemical Society.

### CARBON TETRACHLORIDE

Owing to its non-inflammability carbon tetrachloride has an important use as a solvent for sulphuric chloride used in acid curing inner-tube splices, etc. Its use as a rubber solvent in spreading work is feasible economically by modification of the method of drying the fabric so that a considerable proportion of the solvent can be recovered. Considerable progress in this direction is expected in the near future.

### ORGANIC RUBBER COLORS

Organic rubber colors, made from coal tar intermediates, in all desired shades for every cure, are furnished to the rubber trade in two forms: as commercially pure dye, and as lakes in which the color is set on a white base, such as blanc fixe, to any desired percentage. The average amount of straight dye used is 1½ per cent for all stocks, while that of the lakes varies from 5 to 15 per cent, depending upon their strength.

### TIDECO CLAY

Clay is one of the compounding ingredients the use of which in a rubber mixing increases the abrasive resistance of the resulting cured product. Tideco is the trade designation of a clay specially prepared for rubber compounding. It has very fine texture and moisture content less than one per cent, will pass through 200 mesh and is free of grit.

### YORK WHITING

A new whiting of 300 mesh fineness specially prepared for the rubber trade as a compounding ingredient is now being produced in York, Pennsylvania. The mill is close to many rubber manufacturing centers, therefore freight rates are favorable and render this whiting particularly economical.

**DURING THE YEAR 1922 ENGLAND BOUGHT FROM US AUTOMOBILE tires with a total value of \$3,301,073; Cuba and Mexico following with purchases valued respectively at \$1,104,373 and \$1,014,935.**

**THROUGHOUT THE YEAR 1922 CHILE CONTINUED A GOOD CUSTOMER for our mechanical rubber goods, in November outdistancing other countries with a purchase valued at \$85,897.**

## The Editor's Book Table

### Book Reviews

"RECENT PROGRESS IN RUBBER CHEMISTRY AND TECHNOLOGY." by Philip Schidrowitz, Ph.D., F.C.S. Benn Brothers, Limited, London. D. Van Nostrand Co., New York. Boards, 4½ by 7¼, 64 pages, 1922.

In five brief chapters the author reviews concisely the results of rubber research under the following topics: Plantation Rubber, Mechanics of Vulcanization, Rubber Manufacturing Industry, Mixing Ingredients, Properties of Vulcanized Rubber. Chemists and rubber workers will find the author's presentation of these high spots of rubber chemistry and technology interesting and valuable.

"EXPORTERS' ENCYCLOPAEDIA, EIGHTEENTH ANNUAL EDITION, 1923." Published by the Exporters' Encyclopaedia Corporation, New York, N. Y. Cloth, 1,480 pages, 6 by 8 inches.

Approximately 1,500 pages of specific information of value to the exporter and manufacturer are contained in this eighth annual edition in which over 11,000 corrections and additions are said to have been made. As now arranged, there has been supplied comprehensive information regarding foreign countries, particularly with reference to consular regulations and charges, customs regulations, ports and trade centers, shipping lines, cable rates and regulations, market conditions, currency, weights and measures, conversion tables, etc.

"More than a book—a service" is rendered in the publication of this encyclopaedia, as supplementary bulletins are issued twice a month and an information bureau service is available to each subscriber.

"FABRIC ANALYSIS." BY E. A. POSSELT, CONSULTING EXPERT on textile designing and fabric structure. Published by the Textile Publishing Co., 2152-2154 North 21st street, Philadelphia, Pennsylvania. Cloth, 231 pages, 5 by 7¼ inches, illustrated.

In this his fourth volume of standard handbooks of the textile industry, the author stresses the value to buyers and users of a knowledge of textiles from fiber to finished fabric, and shows how a buyer may readily find out if he is getting goods as specified and how a user may determine what material and weave will best serve his needs. Particularly helpful to the users of cotton in the rubber industry are the hints on ascertaining weight, weave, texture, materials, strength, stretch, moisture content, abrasion resistance, and porosity of fabrics; the testing of fibers microscopically and chemically; mechanical tests of yarns for twist, count, number, take-up, elongation, regularity, and cleanliness; and the testing of water and the removal of stains. Numerous illustrations greatly elucidate the text.

"JAPAN AS AN AUTOMOTIVE MARKET." BY WILLIAM I. Irvine, Trade Commissioner. Special Agents Series—No. 217. Published by Department of Commerce, Government Printing Office, Washington, D. C. Paper, 64 pages, illustrated, 6 by 9 inches.

This bulletin is a very comprehensive survey of automotive conditions in Japan, special attention being given to the market position of the United States. American motor vehicles imported in 1920 are estimated as 95 per cent in number and 93 per cent in value, while American vehicles continue to outnumber those of European make. Tires, however, manufactured by the Dunlop Rubber Co. of Kobe, a branch of the well-known British company, hold the lead, followed by the products of the Yokohama Rubber Co., an American-Japanese concern. During the last two years a prominent American tire company has become established in Japan, and is said to report a steady increase in business. The life of a tire is short in Japan, due to bad roads and lack of tire repair facilities and materials. The average is about 2,000 miles for fabric and 6,000 for cords.

"THE SHOE INDUSTRY." By Frederick J. Allen, A. M. Henry Holt & Co., New York, 1922. Cloth, illustrated, 415 pages, 5 by 8 inches.

In this volume the author presents the results of years of intensive study of the highly developed American leather shoe industry. The methods, machine operations, and factory organization will prove of interest and value to the rubber footwear manufacturers and producers of rubber heels and soles. The use of rubber in leather shoe making as heels, soles, and cement, and as rubber footwear is briefly referred to.

"FACTS AFFECTING THE IMPORTATION OF RUBBER PRODUCTS INTO CANADA." Separate monograph prepared by the Rubber Division, Department of Commerce, P. L. Palmerton, chief. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C. Paper, 8 by 9 inches.

While this bulletin sets forth Canada's importance in connection with rubber manufactures, the country ranking sixth among the nations of the world in its consumption of crude rubber, it also indicates the leading part that the United States plays in this industry, our country owning 51 per cent of the \$42,787,584 invested. In 1919 there were in Canada 32 plants manufacturing rubber goods, these plants being owned by 22 companies.

"FACTS AFFECTING THE IMPORTATION OF RUBBER PRODUCTS INTO MEXICO." Separate monograph prepared by the Rubber Division, Department of Commerce, P. L. Palmerton, chief. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C. Paper, 8 by 9 inches.

Mexico represents one of this country's most important markets, as 97 per cent of all the rubber goods imported into Mexico come from the United States, total values for 1914 being \$497,970, rising to \$2,621,174 in 1922. Our country now exports to Mexico approximately 90 per cent of that country's tires, while Mexico also ranks high in her imports of our rubber footwear. With mining as the chief industry, Mexico is our best market for all kinds of our mechanical rubber goods, total exports from the United States of such products having exceeded those to any other country in each of the past three years.

"DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA." By A. L. Dyke, author of "Dyke's Motor Manual," etc. Thirteenth Edition. Published by Goodheart-Wilcox Co., Inc., Chicago, Illinois. Cloth, illustrated, 1226 pages, including index, 7 by 10 inches.

The thirteenth edition of this well-known and thoroughly comprehensive publication appears in a new form as considerably enlarged, while the whole has been rewritten, thus bringing it entirely up to date. The work may be divided into thirteen main sections, one of these including the subject of tires. Many subdivisions contain various sets of "instructions." There are more than four thousand illustrations in this new edition, while the carefully prepared index, with its elaborate and helpful system of cross-indexing, continues to be an important feature.

"AUTOMOBILE REPAIRING MADE EASY; SHOP METHODS—Equipment—Processes." By Victor W. Page, author of "Automobile Questions and Answers," etc. Published by The Norman W. Henley Publishing Co., 2 West 45th street, New York, N. Y. Cloth, illustrated, 1033 pages, 5 by 8 inches.

This volume, prepared by one who in this and other books has made a special study of his subject, appears to be very comprehensive. The many illustrations and charts should help to make it of great interest not only to the automobile repairman but to the manufacturer as well. One of the fourteen chapters is devoted to a discussion of the subject of wheels, rims, and tires, the question of tire repairing being very fully treated. The volume is well-indexed, and a supplementary chapter contains a number of useful tables.

## Recent Articles Relating to Rubber

**Effect of Variations in the Sulphur and Hexamethylene-tetramine Content on Properties of Compounded Rubber.**<sup>1</sup> The compound chosen consisted of 100 volumes of rubber, 10 volumes of XX red zinc oxide, 2 volumes of carbon black to color the compound, and the curing agents. It was desirable to have a black compound in order to be able to observe the bloom more easily. The sulphur content was varied from 10 to 4 per cent by weight and the accelerator content from  $\frac{1}{2}$  to 2.2 per cent by weight.

The results show that the stocks became non-blooming when the free sulphur content, calculated to 100 of rubber averaged 1.1 per cent. A heavy bloom results with 2.0 per cent free sulphur. Therefore, to produce a non-blooming stock, the total free sulphur added calculated on the rubber should not exceed the desired vulcanization coefficient plus one. This does not take into consideration reclaimed rubber, which inhibits blooming to a considerable degree.

Compounds with low sulphur content overcure less easily than those with higher sulphur content. At the optimum cure neither the amounts of hexamethylene-tetramine nor sulphur, within the limits of the investigation, greatly affected the aging deterioration. However, there is a rough parallelism between aging, deterioration, and vulcanization coefficient. It has been noted that low sulphur compounds reach their optimum cure at comparatively low vulcanization coefficients which would indicate superiority in aging qualities of low sulphur stocks.—Harlan A. Depew.

**The Resilient Energy and Abrasion Resistance of Vulcanized Rubber.**<sup>2</sup> Determination of the relative merits of mineral and organic pigments commonly used to increase abrasive resistance in vulcanized rubber. These pigments include zinc oxide, gas black, light magnesium carbonate, China clay, and colloidal barium sulphate.

For the preparation of vulcanized compounds of high abrasive resistance the following principles are suggested: (1) The use of a high grade accelerated basic mix, cured to the highest tensile consistent with satisfactory aging qualities; (2) the use in sufficient amounts of combinations of the two types of reinforcing pigments—*a*, a pigment which gives great rigidity and high tensile and resilient energy, and *b*, a pigment which gives high extensibility. It should also give some increase in tensile and resilient energy; (3) these pigments to be combined in such proportions that the product of resilient energy and hardness is a maximum; (4) avoidance of the use of more than very limited proportions of any pigment which does not give an increase in tensile strength and resilient energy capacity. Which combination of pigments can be used to greater advantage will evidently depend upon the abrasive results obtained and upon such practical considerations as the specific gravity of the compound, volume cost, heat conductivity, hysteresis loss, permanent set and the ease of compounding and handling.—H. W. Greider.

**Hard Rubber and Its Application in the Chemical Industries.**<sup>2</sup> General discussion of the nature and properties of hard rubber, the equipment obtainable and examples of its use in various industries, such as acid and chemical works, dyeing plants, the manufacture of food products, etc.—A. C. Butfield.

**Antimony Sulphide and Iron Oxide as Rubber Compounding Ingredients.** The authors' summary of results reads: (1) Iron oxide is not an accelerator of vulcanization in pure mixings, but antimony sulphide accelerates slightly. (2) In the presence of brown substitute iron oxide accelerates to the same extent as antimony sulphide, the latter substance not being influenced by the presence of substitute. (3) Mixings in which antimony sulphide is used possess superior strength to similar mixings containing

iron oxide. (4) Mixings containing iron oxide do not age well; antimony sulphide mixings possess good aging qualities.—E. Anderson, and W. M. Ames, *Journal of the Society of Chemical Industry*, March 29, 1923. 136T-139T.

**Vulcanizing with Ultra-Accelerators.** Rubber is mixed with the ingredients and ultra-accelerator but omitting the sulphur. The mixture is sheeted or otherwise shaped and sprinkled with sulphur, with or without other powders. The sprinkled goods are kept at 50 to 60 degrees F. and the sulphur gradually penetrates and effects satisfactory vulcanization. The time necessary depends on the thickness and other factors. Excess or variable quantity of sulphur is immaterial. There is no inequality of vulcanization because the degree of cure is regulated by the quantity of accelerator present.—U. Pestalozza, *The India Rubber Journal*, 1923, 65, 238.

**Mechanism of the Action of Aniline and Its Homologs as Accelerators of Vulcanization.** T. Kimishima, *Journal of Chemical Industry, Japan*, 1922, 25, 1141-1153.

**Technical Value of the Products of Dry Distillation of Scrap Rubber.** Yield of a 50 per cent fraction was obtained boiling below 200 degrees C., very volatile, easily miscible with common organic liquids, oils, etc., and having good solvent properties for rubber, resins, etc. This might be useful as a turpentine substitute in the paint and varnish industries, but the boiling range and unpleasant smell probably render it unsuitable as a rubber solvent.—A. Van Rossem and P. Dekker, *Chemisch Weekblad*, 1923, 29, 78-82.

**A Caoutchouc Bromide and a Direct Method for the Estimation of the Caoutchouc Hydrocarbon in Rubber.** M. Pontio *Annales de Chimie Analytic*, 1923, 5, 39-42.

**Determination of Dry Rubber in Latex.** The coagulum produced by successive additions of sulphuric acid and alcohol is converted into crêpe, dried and weighed at 70 degrees C.—H. P. Stevens, *Bulletin of the Rubber Growers' Association*, 1923, 5, 59-60.

**Confirmatory Tests with Sodium Silico-Fluoride.** As in previous tests, sodium silico-fluoride slightly retards the rate of cure; the larger the proportion used, the greater the retardation.—H. P. Stevens, *Bulletin of the Rubber Association*, 1923, 5, 114.

**Rubber Coagulated with Sodium Silico-Fluoride, Hydrofluosilic Acid, Its Salts and Bifluorides.** The only ascertainable effect is a slight reduction in the rate of cure.—H. P. Stevens, *Bulletin of the Rubber Growers' Association*, 1923, 5, 170-172.

**Vulcanizing Properties of Preserved Latex.** There is no evidence to show that caustic soda preservative has a deleterious effect on the latex or rubber therefrom. Water extracted sprayed rubber was found to vulcanize very slowly, indicating that the rapid vulcanizing qualities are due to the soluble substances and possibly ammonium salts which are thus extracted.—H. P. Stevens, *Bulletin of the Rubber Growers' Association*, 1923, 5, 168-170.

**Mechanical Problems in the Rubber Industry.** Discussion by the Manchester Section of the Institution of Rubber Industry.—*The India Rubber Journal*, May 5, 1923, 15-16d.

**The Vulcanization of Rubber.** Cantor Lecture II. The Royal Society of Arts.—H. P. Stevens, *The Rubber Age*, London, May, 1923, 127-134.

**Stress-Strain Diagram in Tensile Tests of Soft Rubber.** The author has constructed an autographic charting device for recording stress-strain curves applicable to the Shopper testing machine, by which the diagrams produced are always on the same scale. He also makes variable the transferring ratio between the power of the machine and the autographic device in inverse ratio to the cross-section or diameter of the ring. The device can be employed to draw hysteresis loops as well as stress-strain diagrams.—Alfred Schob, *Gummi Zeitung*, January 19, 1923, 235-237.

<sup>1</sup>Presented before the Rubber Division, A. C. S., Pittsburgh, Pa., September 4-8, 1922.

<sup>2</sup>Presented before the Rubber Division, A. C. S., New Haven, Conn., April 2-9, 1923.

### New Trade Publications

AN ILLUSTRATED CATALOG FEATURING SEVERAL TYPES OF TIRE molds and a full line of "Pacific" vulcanizing equipment is being issued by The L. L. Caldwell Co., 2405 South Main street, Los Angeles, California. The company also specializes in automobile parts and accessories.

SECOND AND THIRD EDITIONS RESPECTIVELY OF INFORMATIVE BULLETINS entitled "Patents—Law and Practice" and "Trade Marks, Trade Names, Unfair Competition," have been recently published by Richards & Geier, patent and trade-mark attorneys, at 277 Broadway, New York, N. Y. These publications have been prepared in concise form as convenient handbooks for ready reference. A copy will be mailed to any interested reader without charge.

THE SPRING BULLETIN, PRINTED ON RUBBER LATEX PAPER, OF THE Reliance Rubber Co., Limited, 212-213 Upper Thames Street, London, E. C. 4, England, contains a special supplement for the wholesale trade only. Among other interesting features was the paper, "A Bigger and Better Rubber Sundries Trade," that was presented at a recent meeting of the Manchester Section, Institution of the Rubber Industry, by Fordyce Jones, president of the Reliance Rubber Co.

MUCH INFORMATION OF A PRACTICAL NATURE REGARDING mechanical rubber goods is conveyed to the reader in a catalog recently issued by The Diamond Rubber Co., Akron, Ohio. There are many illustrations and specifications in connection with this company's very complete line of mechanical equipment.

INCLUDED AMONG THE INSTITUTIONS WHICH ARE ENDEAVORING to secure standardization as an aid to industrial efficiency is the American Engineering Standards Committee, 29 West 39th Street, New York, N. Y., whose latest publication is indicative of this organization's line of work. The Committee's 1923 "Year Book" mentions among many co-operating institutions The American Society for Testing Materials, The United States Department of Commerce, The American Society of Mechanical Engineers, The Society of Automotive Engineers, The National Association of Manufacturers of the United States of America, and The Rubber Association of America.

### GERMAN TRADE JOURNALS MERGE

A merger of *Der Technische Handel* with *Gummiwelt*, a German publication devoted to the rubber industry, has been recently announced. Under the new arrangements the periodical will give particular attention to the rubber trade, and will appear under the name *Der Technische Handel*.

### EXPORTS OF AMERICAN RUBBER GOODS DURING 1922

Rubber goods exported in 1922 from the United States show values totaling \$33,450,832, a gain of \$3,242,877 over 1921. Tire exports, valued at \$20,393,034 in 1922, as against \$16,313,414 in 1921, are responsible for the increase. Exports of rubber footwear and soles and heels also increased from \$3,909,261 to \$4,439,633, mechanical rubber goods, however, decreasing from \$4,106,937 in 1921 to \$3,154,594 in 1922. Exports of druggists' rubber sundries remained practically even at \$871,465.

England represented during 1922 by far our best customer for automobile tires, taking 334,043 casings, valued at \$3,301,073; Mexico, at \$508,514, and British South Africa, at \$456,330, led in purchases of mechanical rubber goods; while in the demand for footwear, particularly canvas shoes with rubber soles, the Philippine Islands, with imports valued at \$462,501, represented the best market. Japan, England, Norway and Mexico also took large supplies of rubber boots, shoes and overshoes. Exports to England of our druggists' rubber sundries increased from \$210,575 in 1921 to \$343,127 in 1922, while the total exports of our rubber thread, valued at \$1,193,301, went to England, France, Japan, Italy, Canada, Belgium, Switzerland and Spain.—*Commerce Reports*.

### Firestone Company Resigns From Rubber Association

Announcement was made on May 18, at the Washington office of Harvey S. Firestone, president of The Firestone Tire & Rubber Co., of the company's resignation as a member of The Rubber Association of America.

The letter of resignation, signed by Mr. Firestone and addressed to A. L. Viles, general manager of The Rubber Association of America, very plainly states Mr. Firestone's reasons for the company's withdrawal from the national organization. Mr. Firestone's letter, as published in the daily press, follows:

"In behalf of The Firestone Tire & Rubber Co. I hereby tender, for the attention of your Board of Directors, its resignation as a member of The Rubber Association of America. This action is taken only after mature consideration and with the greatest reluctance. The failure of your organization to cope with the major problems of the association, especially the crisis created by the Rubber Restriction Act, has impelled this action.

"In the beginning this company called your attention to the laws and has ever since urged you to action. You appointed a committee to confer with the rubber growers. We protested that this would be a waste of time. Months have elapsed—the rubber growers have reported urging more strict enforcement of the laws. Nothing has been accomplished.

"Feeling this would be the result, we have been doing everything in our power to bring about a protest to the British Government through the proper channels available. We have not had your cooperation. We have had only your continued opposition.

"Immediately after the failure of your negotiations with the rubber growers, the writer appeared before your board and asked their cooperation with the work outlined by the Washington conference. You unanimously refused and circularized your membership to that effect. You withheld from your membership notice of the fact that at the same meeting, in my absence, you were unanimously of the opinion that Secretary Hoover's suggestion of a rubber buying organization to combat the British monopoly of rubber production 'would be unwise and ineffective.' Nor did you advise your membership that at the same meeting you appropriated \$5,000 of the association's funds to employ a publicity agent to use the trade papers and general press to 'quiet any misapprehension' that existed as to the Rubber Association's viewpoint on the restriction laws.

"The United States Government has recognized the problem as vital, affecting both our peace, prosperity, and war security, and has appropriated a substantial fund for the investigation of a safe and adequate source of supply.

"This company desires to do everything in its power to further this worthy project and to continue the agitation for the repeal of the British laws. We have been aware of your opposition, even of your direct appeal to the membership to have nothing to do with our efforts, but when you employ the funds of the association—a substantial portion of which this company contributes—to actively oppose by systematic and organized publicity our efforts to secure the repeal of the laws and better conditions for the rubber industry and the consumers of rubber products, there apparently remains no choice.

"It is with great regret that the writer notifies you of this decision. Especially in view of the fact that he had the honor of being president of the association during the reorganization period and has always had in mind the high purpose for the good of the industry and the American public it might serve."

THE THREE LEADING PURCHASERS DURING 1922 OF OUR RUBBER thread were England, taking goods valued at \$577,127; France, \$338,339; and Japan, \$117,871. Other countries who bought, on a much smaller scale, were Italy, Quebec and Ontario, Belgium, Switzerland, Spain and Brazil.

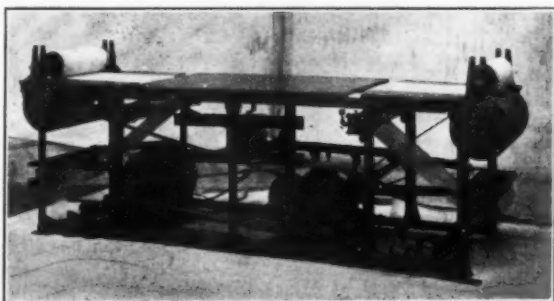
## New Machines and Appliances

### Booking Table for Bias Cutter

THE booking table for use in connection with the Scofield bias shear here illustrated consists of two let-offs for the wrapper and two wind-ups for the wrapper and the strips that come from the bias shear.

The machine is driven by a variable speed motor, and the speed so regulated that when one strip is wound up the next strip from the shear is at hand.

The operation of the machine is continuous. It winds the strips at either end alternately as fast as the shear cuts them and with-



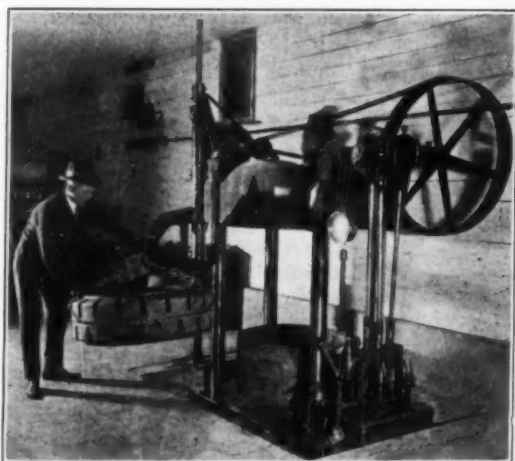
Bias Cutter Booking Table

out stoppage for changing.—Birmingham Iron Foundry, Derby, Connecticut.

### Hydraulic Tire Lift for Tire Forcing Press

A very effective hydraulic tire lift for handling solid tires in and out of a forcing press is here pictured in operation.

It comprises a vertical hydraulic cylinder attached to one corner of the press and carrying an arm that swings around the strain rod of the press, with the lifting hook directly in the center of the pressure platform.



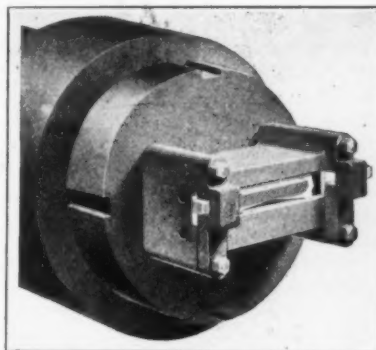
Hydraulic Tire Lift

The cylinder pivots on the ram of the lift and the heaviest tires and wheels can be moved in and out of the press very readily by one man. The capacity of the lift is 2,000 pounds.—The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio.

### Die for Tubing Tire Treads

It is common American practice to form tire tread stock by means of the tubing machine. The proper design for a successful die for this purpose is a matter requiring considerable skill.

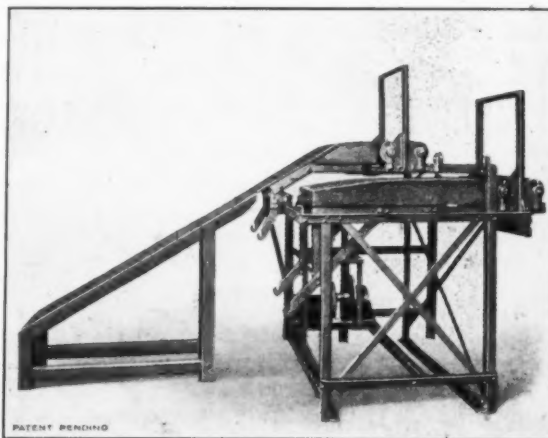
The die here illustrated embodies several important advantages, namely: it is inexpensive, easily operated and quickly adapted to any size tread by removing a key and inserting a change die. It is built of high-grade steel, unbreakable, light weight, convenient, economical, and can be used on any tubing machine.—The Akron Standard Mold Co., Akron, Ohio.



Akron Standard Tread Die

### Bias Cutter Wind-Up Machine

The wind-up machine here illustrated is designed to roll frictioned stock on shells after it has been cut on the Bolton vertical bias cutter. The machine is strongly built and has a direct motor drive controlled by a disk transmission to secure variations of speed. The tables are evenly balanced and move on tracks. The speed of the machine is automatically adjusted to that of the bias cutter and is under control by the operator at all times.



Spadone Wind-Up Machine

In operating the machine, a roll of lining is placed in the lower racks and laced over the surface of the table to a shell on the back drive rolls. Either table can be prepared while the other is in operation. The cut blocks of stock are placed overlapping on the bench and partially on the lining to pull the blocks with sufficient drag to eliminate wrinkles. As soon as one roll is filled with cut stock the tables are shifted, which may be quickly done without stopping the bias cutter.—Spadone Machine Co., 15 Park Row, New York, N. Y.

### Automatic Core Chucks

That the type of automatic chuck here illustrated sets the pace for economy of installation, high efficiency and great reduction in equipment required for stated production, is amply demonstrated by the fact that within nine months of its introduction 51 factories were using it.

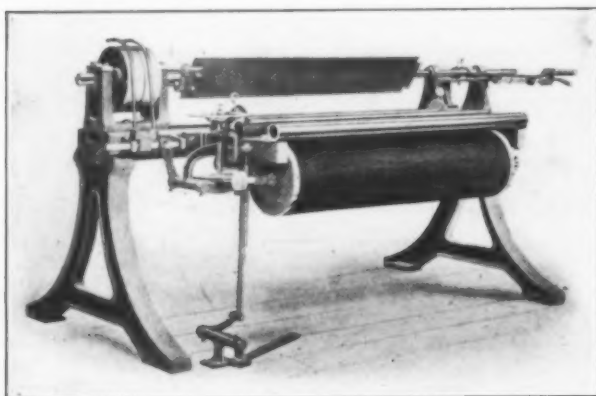
This type of core was designed for machine building of cord tires, and might be termed the universal chuck, as only one is required for a unit. It is only necessary to change eight bolts to use any core from 30 by 3 to 37 by 5 inclusive. Thus, full efficiency of chuck and core is obtained. Every automatic core chuck is interchangeable and may be used on any standard tire building machine. The material and workmanship in these cores correspond in quality to their perfection of design.

A smaller chuck known as the "Junior," of the same design and construction, permits collapsing of 20-inch base cores. It may be used anywhere that the larger chuck can be by simply removing two bolts and changing chucks. One chuck only is necessary for cores 27 by 3½; 28 by 4; 29 by 4½, and 30 by 5.—De Mattia Bros., Garfield, New Jersey.

### Cloth Lapping Machine

The lapping machine shown in the accompanying illustration is used for folding piece goods whether plain or proofed on flat boards for dispatching or shipping.

The machine is made with strong cast iron frame and comprises adjustable drag rails carried by strong brackets, crease rail with roll for doubled goods, movable headstock with hand lever and rack for adjusting the machine to various widths of



British Lapping and Measuring Machine

cloth. It is also provided with a measuring cylinder and indicator to measure the length of cloth lapped. Starting and stopping the machine is under foot pressure control.—Hacking & Co., Ltd., Bury, near Manchester, England.

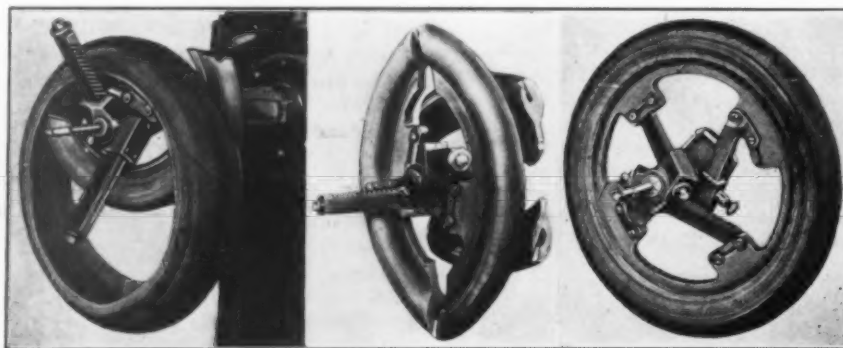
### Tire Mold Conveying System

A system for transporting heavy tire molds about the vulcanizing room to and from the heaters is a necessity in any tire plant making a considerable output. In fact such a system is an im-

portant factor, reducing labor costs and increasing production. The automatic mold handling system here illustrated is known as the Palmer Bee System and is represented as installed in the Pharis Tire & Rubber Co., Newark, Ohio. This is one of the smaller types of mold handling machinery and is capable of handling

the mold requirements of seven vulcanizers. Its use has increased the curing capacity approximately thirty per cent.

The system is rectangularly arranged around the line of vulcanizers. The travel of the molds is from the press seen at the distant end of the table in the right of the picture. At that point



TIRE READY TO TAKE OFF

COLLAPSED CORE

TIRE ON CORE

Operation of the De Mattia Chuck



System for Handling Tire Molds in the Pharis Plant

the tire containing the air bag is placed in the tire curing mold and proceeds by the bench conveyor to the vulcanizers, to which the molds may be deflected for loading.

After curing they travel by the same means around to the opposite side of the system where the cover is loosened and passes on up an incline to a higher level, descending a short space farther on to the general level, where it meets the newly filled mold. Under the elevated cover conveyor portion just mentioned, operators remove the cured tire, replacing it with an uncured one, the filled mold passing on to receive its cover, being then ready for curing.

### Improved Devices on Recording Instrument

The button which holds the chart in place on the Columbia recording thermometer has been modified so that the removal of the button each time the chart is changed is no longer necessary.

The new button works as follows: A simple quarter turn draws in the little metal clips, or fingers, and permits the chart to be removed. Another slight turn in the opposite direction pushes out the clips again and they grip the new chart firmly.—Schaeffer & Budenberg Mfg. Co., and American Steam Gage & Valve Mfg. Division, Brooklyn, N. Y.

### Fabric Embossing and Calender Rolls

In the manufacture of auto top and imitation leather upholstery materials, calender and embossing rolls are used in finishing the goods. Cotton, paper, and husk rolls are also used in calendering fabrics before the emulsions and coating materials are applied to them.

The illustration represents a paper combination embossing roll, partly in section, built up with special paper in disks heavily



Perkins Combination Embossing Roll

compressed. The patented spline which is an exclusive feature of these rolls is seen in the broken section.—B. F. Perkins & Sons, Inc., Holyoke, Massachusetts.

### Mill Type Reflector

A new reflector has been designed for rubber factory service on the mill type B lamp of the Westinghouse company. It is enameled with porcelain, the outside being green and the inside white, the contour assuring efficient distribution of light.

This type of reflector may be attached to brass shell or porcelain sockets by means of brass holders.—Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.

### Hand Power Stock Cutter

A reliable cutter is quite essential in preparing tubed stock for molding small articles in large volume, such as heels, etc. A convenient hand power machine of this sort is here pictured.



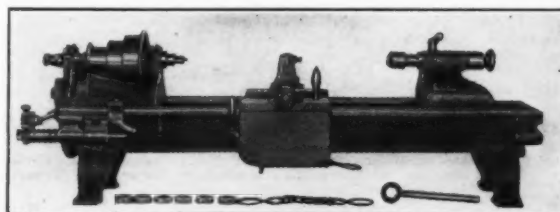
Mollart Stock Cutter

With this machine one man can cut over 50 pieces a minute, all within two per cent of correct weight.—The Mollart Stock Cutting Machine Co., Watertown, Wisconsin.

### Jar Ring Lathe

A simple automatic lathe for cutting jar rings, hose washers and similar stock is shown in the illustration.

The machine is built of the best materials and workmanship.



Crossley Automatic Lathe

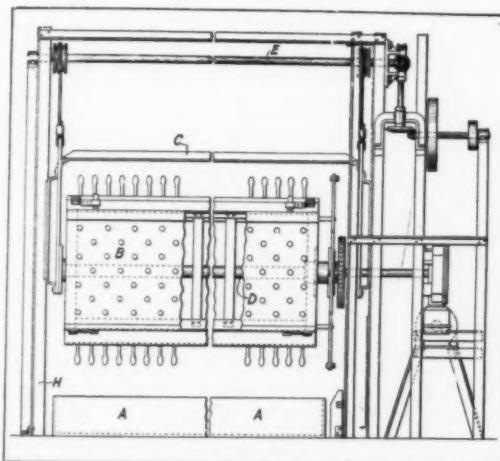
The bearings are made of bronze and the spindle of crucible steel, as are the small gears.

The machine will cut 8 to 22 per inch and has a capacity of 110 rings per minute. One workman can operate two of these lathes at the same time.—The Crossley Machine Co., Trenton, New Jersey.

### Machinery Patents

#### Dipping Machine

This machine applies a coating of rubber to objects by dipping them one or more times in rubber solution. The process is utilized in forming nipples, finger cots, toy balloons and bulbs of medicine droppers on suitable forms.



Automatic Dipping Machine

The machine shown herewith in side elevation comprises a dipping tank A and a form carrier B in the form of a polygonal reel, the two being movable toward and from one another in a vertical direction, so that the forms on the carrier may be dipped into the solution tank. To move the carrier up and down it is mounted as a whole in a vertically reciprocable frame formed by the cross-bar C and the shaft D, on which B rotates. This frame and carrier are raised and lowered by cables attached at each side of the frame and passing over winding drums at either end of shaft E.

In operation, the forms are immersed in the tank to the proper depth, when the carrier motion is reversed, causing it to rise at slow speed. The tendency of the viscous solution to run and form drops is prevented by bringing the freshly dipped form to the top, and in this position the carrier is oscillated a number of

times in each direction until the coating is sufficiently set. Following this the frame is lowered for a new dip on other forms and the operation is repeated until all are coated.—James R. Caldwell, assignor to the Seamless Rubber Co., Inc., both of New Haven, Connecticut. United States patent No. 1,449,744.

## Other Machinery Patents

### The United States

- 1,450,233 Machine for use in manufacturing tire tubes. H. W. Smolk, Cleveland, Ohio.  
 1,450,328 A tire casing mold. T. Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.  
 1,450,481 Heated mold for plastic material. C. F. Burroughs, East Orange, assignor to Composition Machinery Corporation, Newark—both in New Jersey.  
 1,450,747 Tension device for tire building machines. T. Midgley, Hampden, assignor to The Fisk Rubber Co., Chicopee Falls—both in Mass.  
 1,450,794 Repair vulcanizer. D. G. Chandler, Racine, Wis.  
 1,450,944 Tire spreader. W. B. Ecker, assignor of 1/4 to D. B. Cheever—both of Chicago, Ill.  
 1,451,025 Vulcanizing valve. H. P. Kraft, Ridgewood, N. J.  
 1,451,169 Apparatus for the preparation of tire beads. H. F. Maranville, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.  
 1,451,470 Means for forming and securing gaskets to jar covers. W. J. Peete, Chicago, Ill.  
 1,451,510 Mold for heels. L. Holmes, Raynham, Mass.  
 1,451,611 Printing vulcanizer. C. B. Haughey, Council Bluffs, assignor of 1/2 to O. R. Edwards, Davenport—both in Ia.  
 1,451,679 Machine for attaching foxing. L. A. Casgrain, Beverly, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J.  
 1,451,837 Bead making machine. R. McClenathan, Cuyahoga Falls, assignor to Kelly-Springfield Tire Co.  
 1,452,379 Method and apparatus for building laminated strips. U. Haren, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.  
 1,452,615 Wire assembling machine. E. A. Figeon, Akron, Ohio, assignor to The B. F. Goodrich Co., New York City.  
 1,453,123 Mold for rubber mats, etc. L. M. Bickett, Watertown, Wis.  
 1,453,175 Grinding machine. J. E. Perrault, assignor to Hood Rubber Co.—both of Watertown, Mass.

### The Dominion of Canada

- 229,683 Vulcanizing apparatus. The Fisk Rubber Co., Chicopee Falls, assignee of T. Midgley, Hampden—both in Mass., U. S. A.  
 229,877 Last positioning device. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of H. R. Polleys, New Haven, Conn., U. S. A.  
 229,878 Vulcanizer. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of R. N. Van Buskirk, Detroit, Mich., U. S. A.  
 229,978 Guard for rubber mills. L. Gaisman, Stockport, Chester, England.  
 230,224 Mold for making rubber articles. W. A. Snook, Trenton, New Jersey, U. S. A.

### The United Kingdom

- 193,174 Tire mold conveyor. W. J. Mellers-Jackson, 28 Southampton Buildings, Holborn, London; Morgan & Wright, Jefferson avenue, Detroit, Mich., U. S. A.  
 194,214 Mold for wire casings. M. Greenspan, 112 North La Salle street, Chicago, Ill., U. S. A.  
 194,262 Mold for tire casings. A. M. Wolber, 76 Rue des Arts, Levallois, Seine, France. (Not yet accepted.)

### Germany

#### Design Patents Issued with Dates of Issue

- 838,433 (January 24, 1923). Apparatus for making beads for tires. Berliner Maschinen-Treibriemenfabrik Adolph Schwartz & Co., Berlin.  
 839,276 (January 29, 1923). Vulcanizing apparatus for travel and for use in the workshop. Jos. Schierlinger, Pirmasensstrasse 26, Kaiserslautern.  
 839,554 (February 1, 1923). Device for marking pneumatic tires for the purpose of preventing wrong mounting. Mitteldeutsch Gummiwarenfabrik Louis Peter A.-G., Frankfurt-am-Main.  
 839,577 (February 9, 1923). Hand vulcanizing apparatus for vulcanizing defective tire covers. Fritz Schwarz and Willi Schwarz, Staaken.  
 840,327 (September 26, 1921). Device for making seamless rubber goods after the dipping process and with recovery of the solvent. Albert Boecker, Malmö, Sweden; Dr. R. Specht, Hamburg.  
 841,049 (May 1, 1922). Apparatus for warm vulcanizing of rubber soles onto shoes. F. W. Maier, Schlossstrasse 59 b, Stuttgart.  
 841,249 (February 19, 1923). Apparatus for stamping shapes out of rubber, leather, and the like. E. Bornhütter, Stromstrasse 5, Düsseldorf.  
 841,250 (February 19, 1923). Vulcanizing mold for heels, soles, and the like. E. Bornhütter, Stromstrasse 5, Düsseldorf.

- 841,899 (December 27, 1922). Sole scraper for roughening rubber and leather soles. Zome G. m. b. H., Hamburg.  
 842,422 (June 24, 1920). Apparatus to put molds in vulcanizing presses and to take them out. The Dunlop Rubber Co., Limited, represented by R. Korn, Berlin S. W. 11.  
 373,676 (April 12, 1922). Standing calendar for rubber and similar plastic masses. A. Bert Becler, Malmö, Sweden; represented by Dr. Specht, Hamburg.  
 373,677 (June 23, 1921). Machine for stamping designs on lengths of rubber, celluloid or the like. G. Siempelkamp & Co., Arefeld.

## Process Patents

### Vulcanized Rubber Solution

This vulcanized rubber solution may be put to many technological or industrial uses and applied by a brush, pallet knife, or by a spraying nozzle. The solvent employed is prepared by digesting commercial oil of turpentine with hydrated oxalic acid at or above atmospheric pressure at an elevated temperature. The product, after separating the acid, consists of a mixture of light and heavy oils separable by fractional distillation. The heavy oils boiling at 202 degrees C. and above are highly efficient in dissolving sulphur, rubber and vulcanized rubber, including ebonite, and may be diluted with certain of the light oils boiling at below 202 degrees C.

In the preparation of the vulcanized solution the following method is employed. To any desired quantity of crude rubber from 5 to 40 per cent by weight of flour of sulphur is added to form a product of the desired consistency. This mixture is digested, with constant stirring and heat, 140-200 degrees C., until solution is effected. Since the digestion is made at a temperature at which rubber is vulcanized a solution of cured rubber results. The proportion of sulphur is varied so that after volatilization of the solvent the solid product will have the desired characteristics.

When sufficiently diluted the vulcanized solution will pass through parchment and is preferably filtered to remove any foreign bodies that may have been present in the crude rubber. It may be colored with aniline coloring matter or by suitable pigments. In the latter case the pigments are added after filtration; otherwise they may be added at any stage of the process of producing the solution.

On being subjected to heat the volatile solvent is driven off, leaving behind vulcanized rubber. If the vulcanization of the rubber is incomplete for any cause the cure may be completed by the application of heat at a vulcanizing temperature when volatilizing the solvent after application of the solution to the desired article.—William B. Pratt, Wellesley, Massachusetts, assignor to E. H. Clapp Rubber Co., Boston, Massachusetts. United States patent No. 1,451,711.

## Other Process Patents

### The United States

- 1,450,256 Process and apparatus for the manufacture of solid tires. D. E. Goodenberger, assignor to The Firestone Tire & Rubber Co.—both of Akron, Ohio.  
 1,450,462 Method of acidizing rubber waste. R. A. Terhune, Fairhaven, Mass., assignor, by mesne assignments, to C. Gaschott, Corona, N. Y.  
 1,452,326 Method of prolonging the life of expansible vulcanizing cores. J. D. Tew, Hudson, Ohio, assignor to The B. F. Goodrich Co., New York City.  
 1,453,034 Method of vulcanizing tires. H. B. Wallace, St. Louis, Mo.

### The Dominion of Canada

- 229,742 Molding of concrete products. W. J. Stewart, assignee of J. Woolcock—both of London, W. J. England.  
 229,814 Method of making inner tubes for tires. J. Huebner, Detroit, Mich., U. S. A.  
 230,188 Process of molding rubber articles. F. C. Jones, London, England.

### The United Kingdom

- 192,927 Fibrous materials for reinforcing rubber, etc. A. E. Jury, 290 Orient Way, Rutherford, New Jersey, U. S. A.  
 193,207 Rubber floor coverings. Ioco Rubber & Waterproofing Co., Limited, and A. Ryan, Netherpton Works, Anniesland, Glasgow, Scotland.  
 193,770 Method of making goloshes. H. C. L. Dunker, 6 Kungsgaten, Helsingborg, and L. G. A. Stibe, 122 Drottninggaten, Gelsingborg—both in Sweden.

# Activities of the Rubber Association of America

## Restriction of Crude Rubber Exports

THE special committee in charge of the crude rubber restriction matter has been advised that the heavy shipments of rubber from the East are largely due to stocks accumulated before the introduction of the Stevenson plan and that measures will be taken by the British and Colonial Governments to stop smuggling and leakage through other sources. Also that there is no present intention of modifying the regulation plan.

On April 30 the Federated Malay States Government adopted a new rule under the Rubber Act which prohibits the transfer of licenses or coupons except on proof of the bona fide sale of rubber covered thereby. In addition to this, licensed dealers in the East are now forbidden to possess any rubber in excess of the quantity for which coupons or export licenses are held. Any excess rubber held on May 1 must be reported to the government and cannot be disposed of without written permission.

Despite the strong representations of the Rubber Association of America, Inc., and of certain British manufacturers, the British Colonial Office adheres to the belief that restriction is still necessary to stabilize prices at a level sufficiently high to enable the average plantation to earn a reasonable return upon the investment and to encourage new planting and insure future supplies.

The recent trend of prices would appear to lend color to the Rubber Growers' Association's assertion that there is an abundance of rubber to meet immediate requirements. It is by no means certain, however, that this will be the case in six months' time, if American consumption continues as during the early part of 1923.

At the annual dinner of the Rubber Growers' Association, held in London on April 17, Sir James Stevenson said that if the committee's calculations as to the amount of rubber required were wrong, it would not be necessary to repeal the legislation in order to deal with such a situation should it occur. This is further evidence that no immediate repeal is contemplated but indicates that any shortage will be met by the immediate introduction of further elasticity into the scheme, without reference to the stipulated quarterly periods for revision.

The British Embassy in Washington has also advised the Rubber Association of America, Inc., that "the Secretary of State for the Colonies has undertaken to give careful consideration to any evidence which the Rubber Association of America may desire to put forward tending to show the inadequacy of the present scheme to meet the situation in the rubber industry by providing for the exportation of rubber sufficient, with the available surplus in the world's stocks, to meet the estimated absorption while at

the same time providing for a reasonable profit to the producing interests."

The committee in charge emphasizes the following points:

(1) That the American industry should be influenced primarily by a long view, realizing that, with or without restriction, prices must range considerably in excess of those prevailing during the economic depression of 1921 and 1922.

(2) That the Rubber Association of America, Inc., condemns restriction as an economic mistake, believing that, in view of consumption, prices will right themselves without government interference.

(3) That from an economic standpoint it is to the selfish interest of British growers themselves to operate their plantations on a one hundred per cent basis just as soon as it can be demonstrated that the world's supply of rubber is not in excess of the demand. At the present time the British are operating in competition with the Dutch, who are unrestricted.

(4) That the investigation of rubber sources, present and future, by the United States Government has the hearty endorsement and cooperation of the Rubber Association of America.

(5) That, with a keen appreciation of the interests of rubber manufacturers, the automotive industry and the public, the Rubber Association of America, Inc., is doing its utmost to insure an adequate supply of rubber at reasonable prices, not only for present demands but for future requirements.

## Proposed Report on Claims

A plan intended for use only when a claim for adjustment is made to a dealer who does not have adjustment privileges has been recently approved by the Tire Executive Committee of the Rubber Association of America. Under the new arrangement one form is provided for the dealer and another for the tire owner, both statements indicating that an investigation of the matter has been made. On the back of the dealer's form the Standard Tire Warranty is to be reproduced although no offer is made in regard to complying with the warranty by making a repair instead of a replacement.

The principal purposes of the "Report on Claim" are: first, to insure, so far as possible, fair treatment of the consumer; second, to impress him with the fact that it is the manufacturer who is making the adjustment for him; and, third, to indicate that the transaction is being handled in a businesslike way, strictly upon the merits of the consumer's claim in relation to the provisions of the Standard Tire Warranty.

Copies of these forms may be obtained from the Rubber Association.

## Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires, Etc.

MONTH	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
March, 1922	63	5,183,286	2,645,790	2,073,963	63	6,991,118	3,017,511	2,090,737	11	182,197	49,433	48,350
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,438
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,633	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,735,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,343	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,202	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month. "Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on a consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock. "Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse branch, or on a consignment basis, or abroad.

Compiled by The Rubber Association of America, Inc.

### Statistics Compiled from 1923 Questionnaire Covering the First Three Months of 1923<sup>1</sup>

	Reported by Manufacturers Who Also Reclaim (25) Pounds	Reported by Reclaimers Solely (7) Pounds	Total Pounds
Reclaimed rubber produced from raw and cured scrap.....	14,546,664	28,389,193	42,935,857
Scrap rubber (including raw and cured scrap) consumed in production of reclaimed rubber....	20,072,231	29,618,044	49,690,275

#### NUMBER OF POUNDS OF CRUDE RUBBER CONSUMED IN THE MANUFACTURE OF RUBBER PRODUCTS AND TOTAL SALES OF SHIPMENTS OF MANUFACTURED RUBBER PRODUCTS

PRODUCT	Number of Pounds of Crude Rubber Used	Total Sales Value of Shipments of Manufactured Rubber Products
<b>Fires and tire sundries:</b>		
Automobile and motor truck pneumatic casings.....	115,667,104	\$126,329,859
Automobile and motor truck pneumatic tubes.....	28,006,584	17,307,910
Motorcycle tires (casings and tubes).....	271,151	410,194
Bicycle tires (single tubes, casings and tubes).....	915,762	1,134,069
All other pneumatic casings and tubes not elsewhere specified.....	15,240	11,797
Solid tires for motor vehicles.....	15,732,589	9,181,624
All other solid tires.....	200,947	170,868
Tire sundries and repair materials.....	1,149,668	2,361,906
<b>Totals—Tires and tire sundries.....</b>	<b>161,959,045</b>	<b>\$156,908,226</b>
<b>Other rubber products:</b>		
Mechanical rubber goods.....	11,596,086	\$24,192,552
Boots and shoes.....	8,277,291	24,848,853
Insulated wire and insulating compounds.....	1,918,081	7,479,104
Druggists' sundries, medical and surgical rubber goods.....	1,358,603	2,916,853
Waterproof cloth, clothing, and rubber sheeting.....	2,124,846	5,745,145
Hard rubber goods.....	1,959,252	2,990,369
Heels and soles.....	3,511,205	4,819,291
Miscellaneous, not included in any of above items.....	2,393,433	5,759,956
<b>Totals—Other rubber products.....</b>	<b>33,138,797</b>	<b>78,752,123</b>
<b>Grand total—All products.....</b>	<b>195,097,842</b>	<b>\$235,660,349</b>

#### INVENTORY OF CRUDE RUBBER IN THE UNITED STATES AND AFLOAT FOR U. S. PORTS, MARCH 31, 1923

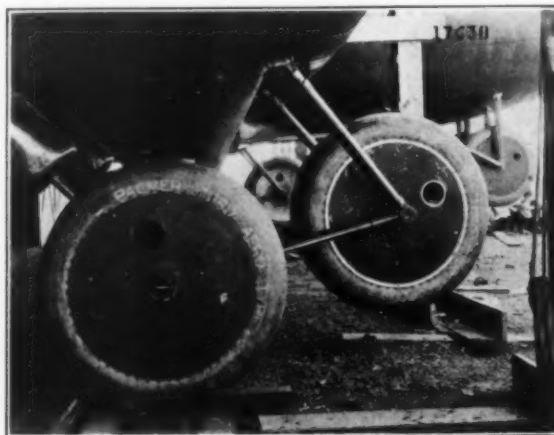
ON HAND	Long Tons		
	Plantation	Para	All Other
Manufacturers.....	60,187	4,209	1,203
Importers and dealers.....	14,933	1,600	203
<b>Totals.....</b>	<b>75,120</b>	<b>5,809</b>	<b>1,406</b>
<b>Grand total—On hand, 82,335</b>			
AFLOAT	Long Tons		
	Plantation	Para	All Other
Manufacturers.....	15,680	178	22
Importers and dealers.....	28,733	303	177
<b>Totals.....</b>	<b>44,413</b>	<b>481</b>	<b>199</b>
<b>Grand total—Afloat, 45,093</b>			

<sup>1</sup> Number of rubber manufacturers that reported data was 269; crude rubber importers and dealers, 38; reclaimers (solely), 7; total daily average number of employees on basis of third week of January, 1923, was 159,981. This data represents approximately 90 per cent of the United States rubber industry.

### Sturdy Landing Gear Required for Big Airplane

Special attention must be given to the construction of the landing gear of large airplanes, the Barling Bomber, recently built by the War Department, Air Service, at McCook Field, Dayton, Ohio, being a particular instance. This great plane, more than 40,000 pounds in weight, has wheels of sturdy construction in order to endure unusual stresses, although the tires are lighter in weight than automobile tires for a corresponding sized wheel would be.

The landing gear structure of the Barling Bomber calls for 10 wheels, 8 large size, 1,500 by 300 mm. (60 by 12 inches) and two smaller or auxiliary wheels, 1,100 by 22 mm. (44 by 7 inches). All wheels are of the Palmer Aero type fitted with clincher type cord



Barling Bomber Airplane Tire Equipment

tires. The wheel axle is four inches in diameter; the length of the hub is 12 inches. The weight of the large size wheel is 150 pounds. Axle steel used on the main landing gear is specified as 130,000 pounds square inch elastic limit.

Each "truck" of the landing gear has two wheels on the front axle and two on the rear axle. The two smaller wheels to the fore of the fuselage are for the purpose of preventing "nosing over." Before landing, the pilot pulls a control, which lowers the front large wheels, causing them to touch first, the energy of landing being absorbed by long-stroke oil cylinders. The reactive force of the ground sets the airplane back on the rear wheels and tail skid, on which wheels the subsequent taxi-ing is done. These rear wheels are sprung by shock absorber rubber of the endless ring type.

### Maximum Load Carrying Capacities for Pneumatic Tires (Pounds)

RECOMMENDED AS STANDARD PRACTICE BY THE EXECUTIVE COMMITTEE, TIRE MANUFACTURERS' DIVISION OF THE RUBBER ASSOCIATION OF AMERICA

Min. Inflation Pressure Pounds	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/2"	5"	4 1/2" Truck	5" Truck	6"	7"	8"	9"	10"	Min. Inflation Pressure Pounds
35	.....	375	425	475	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35
40	.....	300	450	500	700	.....	.....	.....	.....	.....	.....	.....	.....	.....	40
45	.....	350	525	575	800	950	1,200	.....	.....	.....	.....	.....	.....	.....	45
50	.....	*400	*600	*650	*700	900	1,050	1,325	.....	.....	.....	.....	.....	.....	50
55	.....	450	675	725	775	*1,000	1,150	1,450	.....	.....	.....	.....	.....	.....	55
60	.....	.....	.....	.....	1,100	*1,250	1,575	1,050	.....	.....	.....	.....	.....	.....	60
65	.....	.....	.....	.....	.....	1,350	*1,700	1,150	1,325	.....	.....	.....	.....	.....	65
70	.....	.....	.....	.....	.....	.....	1,825	*1,250	1,450	1,700	2,100	.....	.....	.....	70
75	.....	.....	.....	.....	.....	.....	.....	1,350	1,575	1,825	2,250	.....	.....	.....	75
80	.....	.....	.....	.....	.....	.....	.....	.....	*1,700	1,950	2,400	2,950	.....	.....	80
85	.....	.....	.....	.....	.....	.....	.....	.....	1,925	2,075	2,550	3,125	.....	.....	85
90	.....	.....	.....	.....	.....	.....	.....	.....	.....	*2,200	2,700	3,300	3,800	.....	90
100	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,450	*3,000	3,650	4,200	4,650	100
110	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,300	*4,000	4,600	5,100	110
120	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,350	*5,000	5,550	120
130	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,400	*6,000	130
140	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,450	140

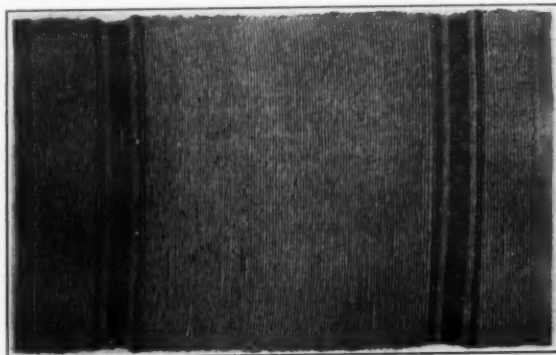
\* Maximum load recommended as safe practice. Higher load and inflation figures are only a guidance for users disregarding recommended limitations.

## New Goods and Specialties

### Grandmother Rag Rugs of Rubber

Now comes the rubber rag rug, with a whole list of points that make it a best seller in practical household goods. In appearance it resembles the very best type of rag rug. Even the knots of the old-fashioned rugs are simulated, and there is the familiar irregular outline at the sides.

In addition to this perfect resemblance the rubber rug has distinctive characteristics which make it adaptable for several uses. It will not slide on tiled floors and it absorbs neither dirt nor water, but can be cleaned or mopped as frequently as neces-

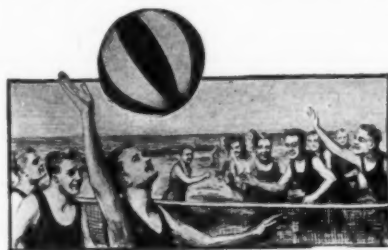


The Goodrich Rubber Rag Rug

sary without the least danger of its bright colors being dimmed and without removing it from the floor. It will lie flat on the floor and its corners will not scuff up; dirt will not sift through to the floor beneath, and it may be had in colors that harmonize with bedroom, bathroom or kitchen.—The B. F. Goodrich Rubber Co., 1780 Broadway, New York, N. Y.

### Air-Ball for Hand Tennis and Other Sports

One of the latest additions to the season's sports is the game of "hand tennis," which is played with a 12-inch inflatable air-ball made of best quality rubberized fabric with seams joined



Air-Ball for Outdoor and Indoor Sport

together by special balloon cement and heavily taped. The fabric used is similar to that employed in the making of dirigibles for the United States Government. It is specially rubberized between the plies and reinforced by a special process. A

football valve is provided, and a small brass tube for inflation. The air-ball comes in four sizes. The 12-inch size is used for hand tennis, the game being played according to tennis rules and regulations except that the hand is used instead of a racket. The 15-inch and 18-inch sizes are for general exercise and sport, and the 30-inch size is especially adapted for cage ball purposes, where any number of players participate on both sides.—The Connecticut Aircraft Co., New Haven, Connecticut.

### A Spring Wire Rubber Tire

A new puncture-proof, non-collapsible tire has a skeleton formed of closely-set arches of steel spring wire supported at either side on steel

hoops, instead of beads. It has for an inner lining one ply of rubberized fabric and two outside, the whole covered with a heavy tread of rubber resting in a channel formed of depressions in the arches. The wire arches are copper-coated, and in the single vulcanization the metal becomes an integral part of the casing. No inner tube is used. In a 33 x 5



The Walton Wire and Rubber Tire

tire there are 260 springs of No. 11 gage wire, and in a 30 x 3½ the springs are fewer and of No. 12 wire. The casings can be made for any vehicle, from a bicycle to a 10-ton truck, and can be retreaded two or more times, giving a mileage two or three times as great as that of ordinary pneumatic tires. Its weight and cost differ but slightly from that of the average pneumatic, and it is said to afford equally easy riding.—James A. Walton, Inventor, 5,007 Range View, Los Angeles, Calif.

### Pocket Size Typewriter with Rubber Type

Quite the greatest novelty in typewriters is also the smallest ever marketed. It is called the Typen and weighs only ¾ ounce. The letters are of rubber and are arranged with regard to frequency of use, there being ample supply of numbers and other characters. A self-inker rotates easily upon a special bearing, and as only high grade glycerinized copying ink is used, a drop will do the work of the day. Alinement is automatic, making it easy to write in columns or squares in bound volumes, such as ledgers, or on labels on bottles, index cards, envelopes, price cards, etc. The dial on the front and back of the machine is equipped with various devices to quickly locate, center, and down the characters. A finger crotch used in operating can be bent to suit the hand.—Dr. Henry Emerson Wetherill, R. D. 1, Phoenixville, Pennsylvania.



The "Typen"

acters. A finger crotch used in operating can be bent to suit the hand.—Dr. Henry Emerson Wetherill, R. D. 1, Phoenixville, Pennsylvania.

### Dust and Valve Cap Combined

In a new valve-sealing device called the "Instanton" the valve cap and the dust cap are combined in one unit. Within the dust cap the sliding split nut, which is the valve cap, threads upon the valve stem and when the dust cap is pushed down as far as it will go two or three turns will bring the rubber washer against the valve opening. At the same time the pressure of the valve stem forces upward a wedge which spreads the split nut and causes it to grip the sides of the dust cap. The operation of putting it on or taking it off requires less than a minute.—The Dill Manufacturing Co., Cleveland, Ohio.



Ideal Hood Lock

### Hood Lock with Rubber Bumpers

The hood lock illustrated has two large rubber bumpers which are held tight against the hood, thus entirely eliminating rattles, it is claimed, as well as side motion of the hood. The lock is of the eccentric type and can be operated with one finger. A much stronger spring is used than is ordinarily employed. Tested to 50 pounds, it can be adjusted to any tension desired.—Ideal Equipment Co., Indianapolis, Indiana.

### Golf Bags of Flexyde

Ten different types of golf bags are being marketed by the Marathon Co., Cuyahoga Falls, Ohio. These are made of "Flexyde," a special product of this Company, which it is claimed will withstand much hard wear and can be cleansed easily with soap and water. The bags are furnished in ten attractive color combinations, and three popular models retail at prices from \$7.50 to \$12.50.

### Improvements in the Goodyear All-Weather Tread

In the new Goodyear All-Weather tread cord tire the change in appearance is noticeable principally in the semi-flat tread and in the slight bevel on the outside edges, which causes the tread to meet more gradually with the sidewalls. A continuous flipper strip which anchors the bead to the carcass more securely than is possible by other methods, it is claimed, is another special feature of the construction. Still other improvements include: reduced rim clearance, resulting in a snug fit of the bead to the rim, thus overcoming the possibility of the bead "rocking" on the rim; heavier gage sidewall rubber of a tougher compound; more rubber in the tread; a double molded process employed in the cure, and larger diamond blocks in the tread design.—The Goodyear Tire & Rubber Co., Akron, Ohio.

### A Favorite Sport Oxford

The crêpe sole attached to any shoe makes a popular seller this season, but the oxford shown in the illustration has an extra style feature in the full crimp vamp, which shoe dealers are finding makes a profitable number.—The Preston B. Keith Shoe Co., Brockton, Massachusetts.



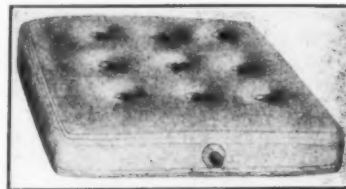
### A Softened and Toughened Crêpe Sole

In the Colombo crêpe sole the manufacturers say that they have overcome a certain harshness of material in the rubber, which offsets any tendency to break off or crumble under certain conditions. The sole is produced in two units, the under unit, or one nearest the shoe, being the heavier. This is sewn through the welt, a strip of leather being inserted to give firmness and stability. The outer unit is then attached, the two surfaces being softened with benzol and then welded together to make a solid sole, the stitches coming only halfway through.—Norman & Bennett, Inc., Boston, Massachusetts.

Crimp Vamp Oxford with Crêpe Sole

### Rubber Pillared Air Cushion

The special feature of the air cushion illustrated is found in the rubber pillars which hold it in shape and prevent it from "ballooning" when pressure is placed upon it. The effect is the same whether the principle is applied to chair cushions or mattresses, a firm, even surface being obtained and retained, thus eliminating the most frequent objection to pneumatic cushions and beds.



Self-Controlled Cushion

The acknowledged advantages of such air bags are that they are strictly hygienic in whatever form used, are easily inflated, and when deflated occupy little space and weigh practically nothing.—The Self-Controlled Air Cushion Co., Limited, London, England.

### Special Feature Oversize Cord

The special feature of the Mohawk Big Chief cord tire illustrated is its double oversize construction throughout. It has a soft elastic tough black tread in the Mohawk flat tread non-skid design, with the added rubber piled up at the edges in such a way that broad road contact is secured and the carcass is protected from water and dirt until it has delivered the last mile. This tire is produced in 33, 34, and 35-inch sizes for automobiles and light trucks and also in the larger truck sizes up to and including the 8-inch size. The manufacturers claim that mileages of from 15,000 to 30,000 on the original tread are not unusual and that the tire is therefore in the list of economies.—The Mohawk Rubber Co., Akron, Ohio.

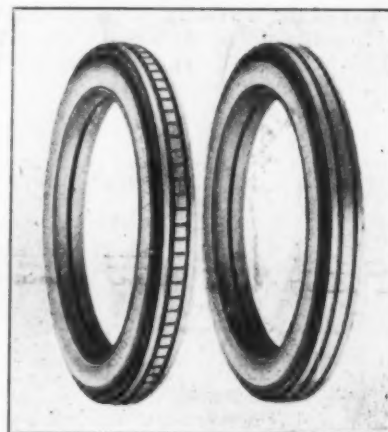


Mohawk Big Chief Cord

### Two English Non-Skid Tread Designs

The claims made for the Belgrave Three-ribbed and the Imperial non-skid tires shown in the accompanying illustration are:

That either is safe on all kinds of surface; there is minimum torsional strain on the sidewalls of either; they do not scour the road into pot holes, and they offer maximum protection against punctures. The fabric employed in their construction is the Belgrave cord, which is not interwoven but is built up of parallel plies, so that there is no chafing and consequently longer life.



Belgrave Imperial and Three-Ribbed Treads

Each layer, after being impregnated and coated with 62 per cent pure gum rubber, is laid diagonally across the last, thus giving maximum strength, resiliency and flexibility and avoiding undue tension at the tread. The most minute gaging is employed to secure perfect balance.—Standard Tyre & Rubber Manufacturers, Ltd., London, England.

## Novel Bathing Accessories

### Pneumatic Surf Board

A new article of interest to dealers and sporting goods houses is shown in the accompanying illustration. It is a pneumatic surf board,



Rubber Surf Boards

might clog up with sand and no metal parts liable to rust or corrode.

The advantages of this board over other surf boards are, according to the manufacturers, greater buoyancy and less danger, both to the rider and to other bathers, besides the special feature that it may be deflated and rolled up into a light, compact bundle which occupies a space only 5 by 5 by 18 inches. The over-all dimensions of the board are 4 feet 6 inches long by 18 inches wide and approximately 3 inches thick. The total weight is 5½ pounds.—The United States Rubber Co., 1790 Broadway, New York, N. Y.

### The Rubber Bandanna for Beach Wear

One of the season's most popular contributions in rubber articles for beach bathing is the bandanna kerchief, which is worn either as a cap, as shown in the accompanying illustrations, or



Two Kleinert Designs in Rubber Bandannas

as a neckerchief, loosely knotted. They are made of rubberized silk in very lustrous finish or of pure gum rubber, and come in solid colors and in a variety of designs.—I. B. Kleinert Rubber Co., New York, N. Y.

The rubber bandanna has been added to the list of Rand products, of the Brooklyn Shield & Rubber Co., also, and particular

stress is laid by the manufacturers upon the fact that the colors and decorations are fast. The designs are striking and the colors brilliant, the edges being bound with contrasting shades. The bandanna is used instead of a cap or tied over the plain diving cap, the ends being gathered in at the back of the neck or drawn around the head and knotted over the forehead.—Brooklyn Shield & Rubber Co., Brooklyn, N. Y.

### Faultless Bathing Caps



A "Faultless" Cap

The bathing caps of the season are not only especially attractive and brilliant in coloring but they are more than ordinarily practical and there are so many different designs that they make window decoration easy. The Faultless Rubber Co. is offering some very attractive assortments to dealers, in special price lots, with display pictures of bathing girl heads for window and counter. The illustrations shown here give some idea of the diversity of the designs. Strong emphasis is laid upon the desirability of dealers making an early display and getting a



Will Not Slip Off



Another Snug Fit

local reputation for carrying an exceptional line before the vacation season actually arrives.—The Faultless Rubber Co., Ashland, Ohio.

### An All-Rubber Bathing Slipper

Among the many attractive designs of bathing slippers on the market, one which is being featured as the "Swan," by the manufacturers of "Fleet Foot" sport shoes of many varieties, commands attention. It is made entirely of rubber, either blue or black in color, with white sole and white trimming bands of ornamental design. It has no straps or laces, but comes up high over the instep and fits up rather snugly around the ankle so as not to slip off in the water. It comes in men's, women's, and children's sizes.—Canadian Consolidated Rubber Co., Limited, Montreal, Canada.

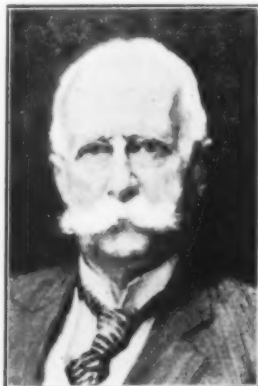
## The Obituary Record

### Noted American Archeologist

IN the March issue of THE INDIA RUBBER WORLD a brief obituary notice recorded the death of Professor William Henry Goodyear, son of Charles Goodyear, inventor of the rubber vulcanizing process. More extended reference, however, should be made to the passing away of so well-known a figure, famous not only as the son of a great inventor, but also through his own remarkable achievements in a very different field of action.

Professor Goodyear was born April 21, 1846, in New Haven, Connecticut, and early evinced an interest in matters connected with architecture and archeology, subjects to which he was to devote his life. He was graduated from Yale University in the class of 1867, and then spent several years of study in Germany, Italy, and the East. Returning to the United States he delivered a series of lectures on historical subjects in some of our leading cities, later becoming associated with the Metropolitan Museum of Art, New York, N. Y., and still later, in 1899, becoming curator of the Department of Fine Arts, Brooklyn Museum, New York. The last-mentioned institution financed Professor Goodyear's investigating expeditions in Europe during the years 1895, 1901, 1903, 1905, 1907, 1910, 1912 and 1914.

To show that plan instead of accident has been responsible for the beauty of famous buildings was Professor Goodyear's chief aim, and his exhaustive investigations were to help present and future generations toward a constructive appreciation of the past. Among his publications are: *The Grammar of the Lotus*, *Greek Refinements*, *Studies in Temperamental Architecture*, *History of Art*, *Roman and Mediaeval Art*, *Renaissance and Modern Art*, and a series of monographs on architecture, published by the Brooklyn Museum. Professor Goodyear was an honorary member of the Royal Academies, Venice and Milan; Architectural Associations, Rome and Edinburgh, and the (British) Society of Architects; and also a corresponding member of the American Institute of Architects. He was also a founder, in 1902, of the American Anthropological Association and a Fellow of the American Association for the Advancement of Science.



Prof. Wm. H. Goodyear

### President of Portage Rubber Co.

Mahlon S. Long, formerly president of the Portage Rubber Co., which failed and was purchased by the Seiberling Rubber Co., died during the latter part of March. Mr. Long had been in poor health for some time.

### President of Hazard Manufacturing Co.

With deepest regret the officials of the Hazard Manufacturing Co., Wilkes-Barre, Pennsylvania, announce the death, on January 20, of Herbert Henry Ashley, president of their organization. As director from 1888 to 1923, vice president from 1908 to 1919, and as president from 1920 to 1923, Mr. Ashley was instrumental in shaping the policy and increasing the prosperity of the organization with which he was so closely affiliated. He was also associated with other industries and institutions in his vicinity, being

at the time of his death president and director of the First National Bank of Wilkes-Barre. He is survived by three daughters and three grandsons.

### Sudden Death of Veteran Executive

Charles B. Street, general superintendent and director of Gutta Percha & Rubber, Limited, Toronto, Canada, died suddenly of heart failure on the evening of May 17. He practically died at his post, as when he left the factory at his usual hour he was apparently as well as ever except for a slight cold. Mr. Street had recently celebrated his eightieth birthday. A personal sketch, outlining the main events of his long rubber career, appeared in the April issue of THE INDIA RUBBER WORLD.

### Treasurer of Panther Rubber Co.

William Bernstein, treasurer of the Panther Rubber Manufacturing Co., Stoughton, Massachusetts, died on April 15, 1923.

### Interesting Letters From Our Readers Poinsettia Rubber Suggested

TO THE EDITOR:

DEAR SIR: Noting the great interest you are taking in finding substitutes for rubber, I take the liberty of suggesting that it might be advantageous to see if the sap of poinsettias could not be used for this purpose.

In Florida these grow with great rapidity from slips stuck in the ground, and have a great deal of milky sap which appears superficially to be very similar to that of the rubber.

We wrote to the United States Government on this, but they took no interest in the matter, merely saying that no investigation had been made of this.

ELIOT A. KEHLER, PRESIDENT, FAWCUS MACHINE CO.  
Pittsburgh, Pa.

### Rubber Production by Americans for Americans

TO THE EDITOR:

DEAR SIR: I see that America is to produce rubber on her own account. She will be extremely sorry if she tries to do so on a big scale anywhere in Latin America. Still if they have got money to burn—and "a person in high authority" is right who predicts the employment of \$100,000,000 of good American money to develop the Brazilian rubber industry—out of good will to your fellow citizens I strongly advise them to carefully study my book on "The Rubber Industry of the Amazon" and then follow the main lines proposed as closely as possible.

Nothing can ever revoke the fundamental principles that I lay down, namely: (1) The need of clearing and draining areas near the rubber tapping centers on which food can be raised and livestock fed so that the *seringueiros* will be independent of Pará and Manãos for their food. The cultivation of rice must be a prominent feature, beans, ground nuts, etc., following as soon as possible. (2) Train the rubber tappers to hunt and fish, especially until the food crops come into bearing. (3) Give the *seringueiros* weatherproof and healthy houses with land cleared round them not only to raise food crops but also for sanitary reasons. (4) Details are given of how cattle, forage crops, and foodstuffs can be raised on lands along the river banks in the upper reaches of the Amazon wherever rubber tapping is carried on extensively.

H. HAMEL SMITH, Editor *Tropical Life*.

London, England.

# News of the American Rubber Trade

## Financial

### New York Stock Exchange Quotations

May 25, 1923

	High	Low	Last
Fisk com.	12 3/4	12	12
Goodrich com.	32 1/2	31 3/4	32 1/4
Goodyear pfd.	54 1/2	54	54 1/2
Goodyear pr. pfd.	96	96	96
Kelly-Springfield com.	47 1/4	46 1/4	46 1/2
Lee com.	27 3/4	27	27 1/2
United States Rubber com.	53	52 1/4	53
United States Rubber pfd.	100 1/4	100	100

### Akron Rubber Stock Quotations

Quotations of May 23 supplied by App-Hillman Co., Akron, Ohio, were as follows:

	Last Sale	Bid	Asked
American com.	7 3/4	...	10
American pfd.	50	...	50
Amazon com.	2	2 1/4	3 1/2
Firestone com.	75	75	76
Firestone 6% pfd.	97 1/2	97 1/2	98
Firestone 7% pfd.	94	94	95
General com.	175	...	174
General 7% pfd.	99	98	99
Goodrich 6 1/2%	100 3/4	100 1/4	101
Goodyear com.	14	14	14 1/4
Goodyear 7% pfd.	53 1/4	53	55
Goodyear 1st mtg. 8%	117	116 1/2	117 1/2
Goodyear deb. 8%	104 3/4	104 1/4	105
India com.	96 1/2	...	97
India 7% pfd.	90	90	92
Mason com.	3 1/4	3	3 1/2
Mason 7% pfd.	37	36	37
Marathon	2 1/4	2	3
Miller com.	85	83	85
Miller 8% pfd.	103	102 1/2	103 1/4
Mohawk com.	17	15	18
Mohawk 7% pfd.	65 1/4	65	67
Rubber Products	20	18	23
Seiberling com.	8	7 1/2	8
Seiberling 8% pfd.	65	60	65
Star com.	20	20	30
Star 8% pfd.	80	...	80

### Westinghouse Earns Twice Its Dividends

The net income of the Westinghouse Electric & Manufacturing Co. for the year ended March 31, 1923, was \$12,263,485. The dividend requirements were \$6,033,428, so that over twice this amount was earned and more than \$6,000,000 added to the surplus. Gross sales for the year were \$125,000,000, which represents an increase of \$25,000,000 over the sales of last year. The cash position of the company is a strong one, the current assets totalling over \$106,000,000, and the current liabilities less than \$17,000,000.

### Hood Rubber Earnings Gain

Sales of the Hood Rubber Co., Watertown, for the fiscal year ended March 31 were \$28,180,007, compared with \$25,239,603 in 1922, \$29,343,939 in 1921 and \$27,636,490 in 1920. Prices last year were well below the level of 1921, so that volume of sales in tonnage made a new high record. Net earnings available for common dividends were equivalent to \$12.89 a share.

Interest on the \$6,000,000 of 7 per cent debenture notes was earned over five and one-half times. Dividends on the \$4,550,000 of preferred stock were earned over five and one-half times. Dividends on the \$1,000,000 of Hood Rubber Products Co., Inc., preferred stock were earned over three and one-half times.

The balance sheet shows a ratio of current assets to current liabilities of about ten to one. Accounts and notes receivable total \$7,402,267 against accounts and notes payable totaling \$1,303,535. Merchandise inventory stands at \$5,670,087 compared with \$7,644,977 a year previously. Bank loans are only \$500,000 compared with \$3,585,000 last year, surplus \$1,529,367 against \$461,370.

The plant is running at full capacity, and the product is sold

ahead as far as the company cares to take orders. It is expected that sales for the present year will be well above the \$30,000,000 mark.

## Financial Notes

The Ajax Rubber Co., New York, N. Y., for 1922 reports net profits of \$26,537 after interest, charges and depreciation, in contrast with a deficit of \$177,920 in 1920, and profits of \$2,201,267 in 1919.

The Brunswick-Balke-Collender Co., Chicago, Illinois, reports net earnings of \$631,631 for the first quarter of 1923. Net income for 1922 after interest, depreciation and taxes was reported at \$2,585,579, compared with a deficit of \$2,279,691 in 1921.

## New Incorporations

American Cushion Tire Corporation, May 2 (Delaware), \$1,000. R. K. Thistle; H. C. Hand; S. C. Wood, all of 65 Cedar street, New York City. Delaware agent, United States Corporation Co., Dover, Delaware. To manufacture and deal in tires for automobiles, bicycles and vehicles of all kinds.

American Wheel & Rim Co., April 30 (Delaware), \$1,000. C. B. Outten; S. L. Mackey; L. C. Christy, all of Wilmington, Delaware. Delaware agent, Corporation Service Co., Equitable Building, Wilmington, Delaware. To manufacture automobile rims.

Apex Rubber Products Co., The, April 4 (Ohio), \$25,000. N. O. Mather; L. A. Fassett; C. H. Lahr; G. L. Keller; L. A. Martin. Principal office, 411 Terminal Building, Akron, Ohio. To manufacture rubber products and sundries.

Bell, A. J. Co., Inc., May 11 (New York), \$10,000. F. W. Fort, East Orange, New Jersey; M. Loprete, South Orange, New Jersey; J. Harrington, New York City. To carry on a vulcanizing and rubber tire business.

Best-Ford Tire & Rubber Co., April 27 (Massachusetts), \$600,000. R. W. Baldwin, president, 17 Suburban Road, Worcester; T. J. Morrissey, treasurer, 18 Bird street, East Walpole; G. E. Bradley, Upton, all of Massachusetts. Principal office, Millbury, Massachusetts. To manufacture and deal in rubber and fabric goods of all kinds including automobile tires.

Birmingham Tire & Rubber Co., February 27 (Alabama), \$1,200. L. C. and R. C. Murray; W. F. Tidyman. Principal office, Avenue B and 21st street, Birmingham, Alabama. To deal in tires and accessories. (Formerly, Murray Tire & Rubber Co.)

Braender Rubber & Tire Co., April 30 (New Jersey), \$265,000. D. Z. Jeselsohn, 85-87 Leslie street, Newark; B. F. Teitelbaum, 383 Communipaw avenue, Jersey City; R. E. Donahue, 25 Bathgate Place, Newark, all of New Jersey. Principal office, Curie avenue, Wallington, New Jersey. To manufacture, buy, sell and trade in and with rubber, rubber tires, rubber goods, etc.

Colonial Tire Sales Co., The, April 20 (Ohio), \$5,000. K. A. Feist; J. Glaser; T. H. Leahy; F. Drukenbrod; C. O. Weintraul. Principal office, Canton, Ohio. To deal in tires and tubes.

Darcoid Co., Inc., May 14 (New York), 1,000 shares no par value. C. S. Hayne, 369-69th street; M. V. Walsh, 2821 Albemarle Road, both of Brooklyn, New York; J. C. Sneath, 2593 Bainbridge avenue, New York City. To manufacture packing, gaskets and mechanical rubber goods.

Detachable Heel Co. of America, May 9 (Delaware), \$1,000,000. P. D. Benson; I. Stein; A. E. Claffey, all of 154 Nassau street, New York City. Delaware agent, Colonial Charter Co., 927 Market street, Wilmington, Delaware. To acquire patents relating to rubber for shoes, wheels for automobiles, wagons or anything relating to vehicles.

Evernu Rubber Heel Corporation, April 26 (Delaware), \$1,500,000. R. K. Thistle; H. C. Hand; S. C. Wood, all of 65 Cedar street, New York City. Delaware agent, United States Corporation Company, Dover, Delaware. To manufacture rubber heels.

Frommel Franklin Tire Co., April 16 (Oklahoma), \$10,000. O. R. and M. L. Frommel; N. W. Franklin, all of Tulsa, Oklahoma. Principal office, Tulsa, Oklahoma. To manufacture tires.

Good Rubber Co., April 12 (Ohio), \$10,000. W. D. Good, president; S. M. Good, vice president; J. B. Good, secretary; E. K. Good, treasurer. Principal office, Akron, Ohio. To manufacture toy balloons, druggists sundries, mechanical rubber goods, etc.

Hand & Graney Tire & Rubber Co., Inc., April 20 (New York), \$5,600. N. F. and F. D. Hand; P. C. Graney, all of 101 Liberty street, Utica, New York. Principal office, Utica, New York. To deal in tires, etc.

Keystone Rubber Co., February 19 (Illinois), \$5,000. R. H. Geier, president; C. C. Bower, treasurer; C. W. Ristow, secretary. Principal office, 203 West Lake street, Chicago, Illinois. To manufacture rubber cement, heling, hose, packings, etc.

Leno Elastic Web Co., May 1 (Massachusetts), \$50,000. J. K. Lanning, president and treasurer, 108 Harwell street; J. Coldwell, 279 Locust street, both of Fall River, Massachusetts. Principal office, Fall River, Massachusetts. To manufacture and deal in textile fabrics including cotton, wool, silk and elastic fabrics.

Miller Rim Corporation, May 4 (Delaware), \$1,200,000. C. A. Cole, Hackensack, New Jersey; A. R. Oakley, Pearl River, New York; R. A. Van Vorhis, 77 Oak street, Jersey City, New Jersey. Delaware agent, Registrar and Transfer Co., 100 West Tenth street, Wilmington, Delaware. To manufacture and deal in rims for automobiles.

Painesville Rubber Co., The, April 23 (Ohio), \$10,000. F. E. Hill; J. Kleinman; H. R. Skala; T. J. Sullivan; M. I. Pollack. Principal office, Cleveland, Ohio. To manufacture rubber products.

Palmyra Packing Co., May 14 (New York), \$100,000. J. N. Todd; F. W. Coates; C. McClouth, Jr., all of Palmyra, New York. Principal office, Palmyra, New York. To manufacture packing for engines, etc.

Rubber, Inc., March 12 (California), \$75,000. P. H. and W. L. Snider; U. Whitehead; P. K. Bryant, all of Long Beach, California. Principal office, Long Beach, California. To deal in all kinds of rubber products.

St. Clair-Athol Rubber Co., March 19 (Michigan), \$350,000. H. Scherer, president; C. H. Davis, vice president; L. R. Kraus, treasurer; H. Miller, secretary. Principal office, 440 Jefferson avenue, East, Detroit, Michigan. To manufacture auto top fabrics, rubberizing fabrics for the raincoat trade, hospital work, etc.

Spartan Rubber Co., February 6 (Texas), \$5,000. W. M. Massie, president; J. L. Cowans, vice president; S. Newman, treasurer; A. Newman, secretary, both of 1934 Broadway, New York City. Principal office, Fort Worth, Texas. To market the products of the Spartan Rubber Company, of New Jersey, in the southwest.

Star Diamond Co., The, April 23 (Ohio), 1,000 shares no par value. O. Wilcox; G. W. Cable; S. B. Berk; R. Dennison. Principal office, Kent, Ohio. To manufacture tires, tubes, boots and all rubber products.

Subers Rubber Co. of Pennsylvania, April 23 (Delaware), \$40,000. J. P. Strickler; C. A. Miller; J. Gault, all of Scottsdale, Pennsylvania; W. H. Grant, Cleveland, Ohio. Delaware agent, Corporation Service Co., Equitable Building, Wilmington, Delaware. To procure contracts for the manufacture of rubber products, etc.

Sun Rubber Co., The, April 4 (Ohio), \$200,000. C. and H. Alvis; J. S. Beumer; D. P. Marshall; F. H. Lahmer. Principal office, Barborton, Ohio. To manufacture rubber products.

United States Liquid Rubber Paint Co., March 31 (Delaware), \$1,000,000. S. Waxman; J. A. Lehman, both of 217 Broadway; S. B. Klee, 772 St. Nicholas avenue, all of New York City. Delaware agent, Arley B. Magee, Dover, Delaware. To manufacture and deal in any and all kinds of varnish and liquid rubber paint, etc.

Van Devere Corporation, April 26 (Delaware), \$100,000. M. M. De Van; C. A. de Vere; F. B. Kraus, all of Philadelphia, Pennsylvania. Delaware agent, American Guaranty & Trust Company, 1600 Delaware avenue, Wilmington, Delaware. To manufacture, sell and distribute rubber tooth brushes, appliances and accessories.

Welch, David W., Tire Co., April 18 (New Jersey), \$250,000. D. W. Welch, 258 Central avenue, Newark; J. T. Castles; W. Castles, both of 19 Loretta avenue, Irvington, all of New Jersey. Principal office, 258 Central avenue, Newark, New Jersey. To manufacture, buy, sell and trade in and with rubber tires of all kinds.

Western Tire Co., The, April 10 (Ohio), \$25,000. J. W. Covell; J. J. Murphy; L. A. Claggen; J. W. Springer; E. Bellstedt. Principal office, 805 Race street, Cincinnati, Ohio. To deal in tires and tubes.

## The Rubber Trade in the East and South Manufactured Goods

Business still continues active in most divisions and many manufacturers are ordering deliveries of material in advance of delivery dates. The usual seasonal decline in output is expected to begin soon. In mechanicals it has already become evident and amounts to 10 to 25 per cent.

Boot and shoe production is up to capacity on fall and winter

The large spring output of tires and tubes has been curtailed by the big manufacturers in accordance with the usual seasonal decline. The small tire manufacturers are still going strong, however.

Rubber heel output continues in good volume. Prices of heels for manufacturers' use are highly competitive and destined to become more so. The crepe sole is gaining in favor over the molded sole for sport wear. It is said that the production of crepe soles consumes four times the weight of crude rubber required for molded sport soles.

Weatherproof clothing manufacture is busy with standard goods and getting out samples of new light weight styles.

## New Offices U. S. Rubber Reclaiming Co., Inc.

On May 1 the executive offices of the United States Rubber Reclaiming Co., Inc., were removed from their temporary location, at 342 Madison avenue, to the Pershing Square Building, 100 East 42nd street, New York, N. Y.

In its "40 years of serving the industry as reclaimers," this well-known organization has followed a line of steady development. The original plant located at Shelton, Connecticut, was established in 1889. In 1900 it became the United States Rubber Reclaiming Works. In 1902 its various branches were united in one plant at Buffalo, New York. In 1909 its capacity, then entirely devoted to the handling of shoe and mechanical scrap, was doubled. In 1911 an addition was put up for the handling of scrap tires. This addition has since been increased and in 1916 a third plant was erected for the manufacture of reclaims especially devoted to insulated wire. In 1913 the company became known as the United States Rubber Reclaiming Co., Inc., which title it bears today.

## Hudson Tire Begins Operations

Operations recently began at the plant of The Hudson Tire & Rubber Corporation, Yonkers, New York. This concern was organized April 19, 1920, with a capitalization of \$1,000,000, and it has secured approximately nine acres of land in the city of Yonkers, with a view to still further expansion in the future. The present building, two stories in height, measures 220 by 110 feet, while plans call for an additional two-story construction in September. The plant equipment is entirely modern, and all machinery is directly connected to electric motors. The rated capacity at the present time is 500 tires per eight-hour day.



Plant of Hudson Tire & Rubber Corp., Yonkers, N. Y.

goods. Dealers' stocks of warm goods were much depleted during the past winter.

Manufacturers of insulated wire are oversold on heavy cables and continue busy on code wire. A decline in demand for the latter is looked for in case suspension of building becomes widespread.

Production of automobile topping is active in keeping with the output of cars.

The officers and directors of the company include: W. M. Doucette, president; H. B. Seymour, vice president and treasurer; and John J. Quinn, secretary. Mr. Doucette has been connected with the tire industry for a quarter of a century, while Mr. Seymour, in addition to being editor and business manager of *The Rubber Age and Tire News* and *Tire Trade Journal*, was also previously associated with The Boston Woven Hose & Rubber Co., The Davidson Rubber Co., and The Plymouth Rubber Co.

### President of the Kelly-Springfield Tire Co.

Arnold L. Scheuer, who was recently elected president of the Kelly-Springfield Tire Co., New York, N. Y., has been chairman of the board of directors for many years and is fully familiar with the affairs of the company. He has long been a partner in the banking house of H. P. Goldschmidt & Co., New York, N. Y., and a member of the New York Stock Exchange. On the death of H. P. Goldschmidt, the senior partner, a few weeks ago, Mr. Scheuer was urged to accept the presidency of the Kelly-Springfield Company. The Goldschmidt firm will be liquidated and as soon as this is accomplished Mr. Scheuer will retire from Wall Street and devote his time exclusively to the Kelly-Springfield Company.



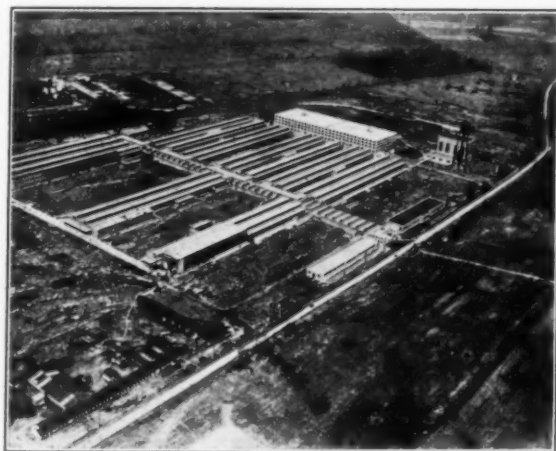
Arnold L. Scheuer

Mr. Scheuer is a director in the following companies: Atlantic Port Railway Corporation; Bankers' Commercial Corporation; Electric Boat Co.; Electric Dynamic Co.; General Ceramics Co.; Ivers-Lee Co.; New London Ship & Engine Co.; Pittsburgh & West Virginia Railway Co.; Submarine Boat Corporation; Transmarine Corporation.

### Dunlop Organization Plans Tire Distribution

Operations have begun at the plant of the Dunlop Tire & Rubber Corporation of America, Buffalo, New York, while commercial distribution of tires is being handled by dealers in New York State and a part of Pennsylvania, this section being designated as the Buffalo territory. Eventually Boston and New England, Chicago, Cleveland, Philadelphia and other important centers will be included in this distribution.

At the Buffalo plant manufacturing facilities have been carefully planned, and in every shop there is a duplication of manu-



Airplane View of Dunlop Plant, Buffalo, N. Y.

facturing appliances. Under this arrangement delay is avoided, while production can, if necessary, be doubled almost over night. The property now includes 214 acres, of which a total of 1,430,000 square feet represents actual floor space. Eventually 15,000 workmen will be employed. Officers of the company include: E. B. Germain, president; J. L. Collyer, factory manager; and William A. Golden, Buffalo branch manager.

### Activities of Pennsylvania Rubber Co.

All previous production records are this year being eclipsed at the plant of the Pennsylvania Rubber Company of America, Inc., Jeannette, Pennsylvania. Sales for the first quarter of 1923 are 40 per cent ahead of the corresponding period of last year, while a 24-hour production schedule is being regularly maintained at present.

The following were re-elected at the recent annual meeting of the stockholders as directors for another year: Herbert DuPuy, Charles M. DuPuy, Seneca G. Lewis, George W. Daum and A. H. Price.

The directors subsequently re-elected the following officers: Herbert DuPuy, chairman of the board; Charles M. DuPuy, president; Seneca G. Lewis, vice president and general manager; George W. Daum, assistant general manager; A. H. Price, treasurer; James Q. Goudie, general sales director; George W. Shiveley, secretary; C. G. Morrill, assistant treasurer; H. H. Salmon, purchasing agent.

The directors also appointed the following as members of the Executive Committee: Charles M. DuPuy, Seneca G. Lewis, George W. Daum, James Q. Goudie, A. H. Price.

Since his reorganization of the company in 1910 Seneca G. Lewis has served continuously as vice president and general manager, while the present official staff have, with one exception, also held since that time positions of responsibility.

### New York

W. D. Schwartz, of the L. H. Butcher Co., 239 Front street, New York, N. Y., who is now abroad, will visit some of the company's European agents. The organization specializes in chemicals and colors used in the rubber trade.

Fred B. Peterson, crude rubber broker, with offices in the New York Cotton Exchange, 60 Beaver street, New York, N. Y., has served for several years with the various Wilson-Holgate companies abroad, including those branches situated at London, Singapore and Colombo, as well as others at Pará and Manaus, in Brazil.

F. W. Dunbar & Co., importers of crude rubber, are now located at 7 Water street, New York, N. Y.

Keller & Christensen, Inc., crude rubber brokers, with offices at 136 Liberty street, New York, N. Y., are representing A. Bendixsen & Co., Limited, London, England, as well as doing a local business. Mr. Keller was formerly in charge of the rubber department of the East Asiatic Co., Inc.

Spencer-Hess & Walters, Inc., crude rubber brokers, announce the removal of their offices as of April 30 to 89 Broad street, New York, N. Y.

The firm of Sheffield & Betts, formerly at 52 William street, New York, N. Y., removed their offices on April 30 to 27 Cedar street, New York, N. Y.

D. D. F. Yard has been recently appointed manager of the Pennsylvania Rubber Co.'s New York sales division, succeeding G. C. McCullough. Mr. Yard, who has been connected with the organization in various capacities for 12 years, will remain also in charge of the export sales department.

Centralization and better working conditions for all departments are secured in the new quarters of the Firestone Tire & Rubber Co., at 63rd street and West End avenue, New York. L. L. McClintock is manager of the New York branch.

### Eastern Notes

New and more commodious quarters have been secured at 335 Fifth avenue, for the Pittsburgh, Pennsylvania, branch of the Link-Belt Co., 910 South Michigan avenue, Chicago, Illinois. According to T. F. Webster, manager of the branch, the large

volume of business transacted by the organization during 1922 bids fair to continue throughout the present year.

The Reading Rubber Co., recently incorporated with \$250,000 capital, will locate, it was decided, at Kutztown, Pennsylvania, where the company already has a small factory. A plant has been purchased and equipped with modern machinery for the manufacture of tires, tubes and other rubber products. Samuel H. Bell, Reading, Pennsylvania; Jesse P. Stiles, Allentown, Pennsylvania, and Frank C. Myers, Trenton, New Jersey, are officers of the company.

Excellent prospects for the future are reported by the Pine Tree State Rubber Heel Co., Sabattus, Maine, manufacturer of rubber heels and molded goods. The output represents at present 15,000 pairs of rubber heels a day, while an increase in equipment by fall is contemplated. F. W. Hodges and T. D. Cowen are in charge.

### Rhode Island Notes

Every plant producing rubber goods or accessories in Rhode Island reports satisfactory business at present and encouraging prospects for an indefinite period. Following the curtailment of production for so long a period, stocks have been depleted to such an extent that the replenishing alone would furnish a general activity for some time, while even a normal demand is reflected in the improved situation. For some weeks there has been a noticeably increasing speeding up in production as well as material additions to the force of employees by practically all the plants in this vicinity, and a steady call is being made by several concerns for more help. Skilled employees are almost impossible to find and unskilled labor is scarce even at minimum wages that a few years ago would have been considered a high maximum.

At Woonsocket business is very brisk at all the rubber and coordinate plants, all of which are calling for additional help, both experienced and inexperienced. Not only are these plants operating at capacity, but several are employing night shifts. At the Alice Mill of the Woonsocket Rubber Co., women on gum shoes and gaiters and men on gaiters are being especially called for at this time, while the Lawrence Felting Plant at Millville, which is under the management of the manager of the Woonsocket Rubber Co., is in need of men for the night shifts in all departments. Men are also being sought by the American Wringer Co. at Woonsocket for general rubber work.

In common with all the other rubber manufacturing plants throughout the State, the National India Rubber Co.'s factory at Bristol has been operating on a full time schedule with plenty of work, but the usual slacking off incidental to this season of the year has resulted in a curtailment of production to five days a week in the shoe departments, although the wire departments will continue to run on full time. Because of a breakdown of one of the large engines furnishing power for the calendering department at this factory, part of that section was closed down temporarily early in the month while the necessary repairing was being done.

The National India Rubber Co., Bristol, has announced that a five-day week will be put into effect, with curtailed production in the shoe division. The wire division will continue on full time until further orders.

The American Wringer Co., Inc., Woonsocket, has been granted a charter under the laws of Rhode Island on the basis of the reorganization plan which has been assented to by the directors of the old corporation. The authorized capital of the new corporation is \$400,000 preferred stock and 25,000 shares of common stock without par value. The incorporators of the new corporation are Edward H. Rathbun, Charles Nourse Cook, Sullivan Ballou and Henry Salomon, of Woonsocket, and Robert J. B. Sullivan, of Narragansett. The concern will continue the same lines of business. John E. Canning is secretary of the new corporation. Un-

der the reorganization plan each stockholder in the new corporation will receive one share of new preferred stock and four shares of common stock for every four shares of the old stock. The plan also provides for a bond issue of \$450,000, of which \$375,000 is to be used to pay merchandise creditors and holders of notes.

### Dr. Burgess Director of Bureau of Standards

Dr. George Kimball Burgess, who has been appointed director of the Bureau of Standards to succeed Dr. S. W. Stratton, was born at Newton, Massachusetts, January 4, 1874. He took his



Dr. George K. Burgess

bachelor of science degree at Massachusetts Institute of Technology in 1896 and the degree of doctor of science at the University of Paris in 1901. He taught physics for 3 years at the Universities of Michigan and California before coming to the Bureau of Standards.

Dr. Burgess has been connected with the Bureau of Standards since 1903, and since 1913 he has been chief of the Metallurgical Division. He is president of the American Society for Testing Materials; is a member of the Divisions of Research Extension and Engineering of the National Research Council, and has served efficiently in the council as well as on the Board of

Editors of the American Physical Society.

He belongs to the National Academy of Sciences, the Philosophical Society of Washington, the Washington Academy of Sciences, the American Institute of Mining and Metallurgical Engineers, the American Institute for Steel Treating and the Iron and Steel Institute of Great Britain. He is a member of the Sigma Xi fraternity and of the Cosmos Club, and is a fellow of the American Association for the Advancement of Science.

He is the author and translator of several books on high temperature measurement and has made numerous contributions to physical and metallurgical journals.

During the war Dr. Burgess was a member of the first scientific mission which was sent to Europe to study applications of science in warfare and means of co-operating with the scientists in allied countries.

### J. J. BLANDIN, ASSISTANT IN CRUDE RUBBER SURVEY

In conducting the crude rubber survey which was recently instituted under the auspices of the Department of Commerce, J. J. Blandin has been appointed assistant to H. N. Whitford, chief of the section. Mr. Blandin has been associated with the Goodyear Tire & Rubber Co., Akron, Ohio, since 1911, having formerly served as head of that company's Rubber Plantations Department. He has also spent six years on the Goodyear plantations in the Far East.

IN OUR EXPORTS DURING 1922 OF SOLID TIRES FOR AUTOMOBILES Cuba led other countries, taking goods valued at \$196,391. England followed, at \$188,146; Australia's share represented \$125,242; and that of Quebec and Ontario, \$125,026. Exports to all countries totaled \$1,518,932.

ENGLAND REPRESENTED DURING 1922 THE LEADING PURCHASER OF our pneumatic tubes for automobiles, taking goods valued at \$246,222. Mexico followed, at \$167,733; Cuba, at \$149,789; Argentina, at \$141,640; and Quebec and Ontario, at \$115,878.

## The Rubber Trade in New Jersey

### Manufactured Goods

The last thirty days have not made any material change in the manufacturing activities of the New Jersey rubber factories. Most of the Trenton mills are still busy making tires, hard rubber sundries and mechanical goods. There is some falling off in the volume of new business being booked as should be expected at this season of the year. Garden hose business, for instance, has kept up wonderfully well notwithstanding wet and otherwise unfavorable spring weather. Some manufacturers are wondering what the demand would be if dry, warm, spring weather had prevailed generally since early April. There is no inclination, however, among local manufacturers to reach the conclusion that this increased demand should be met by any substantial increased manufacturing facilities. They are inclined rather to regard this unusual demand as due to various causes, chiefly the reduction of stock carried over from last year to a lower point than usual, and the desire of the jobbing trade to stock up at favorable contract prices lower than it may be possible to make for 1924 unless raw materials and labor costs show substantial reductions. Business in other mechanical rubber goods lines keeps up very well. The demand for tires has not slackened to any appreciable extent and the same is true of other rubber lines.

### Trenton

The William R. Thropp & Sons Co., East State street, Trenton, New Jersey, specializing in rubber mill machinery, has a new building in course of construction designed for use by the company's electrical department. Electrical clutches, safety appliances, etc., will here be manufactured. Joseph W. Thropp is secretary and treasurer.

N. S. Conover, assistant secretary of the Murray Rubber Co., has been recently appointed receiver for The Miller-Steiner Rubber Co., 678-694 North Olden avenue, Trenton, New Jersey. By order of the court all the raw and finished material at the plant of the last-mentioned company has been sold, and also the machinery. Creditors have been asked to submit their claims, and the result of the receivership will probably be known in about sixty days. The company formerly specialized in the manufacture of mechanical and molded rubber goods.

The Thermoid Rubber Co., Trenton, New Jersey, intends to create a separate tire division, as a part of the work of its plant, and will place O. H. Smith in charge as supervisor of tire sales. With the development of this department the sales force will also be enlarged. Mr. Smith has had much experience in this particular line of work, having been connected successively with The Firestone Tire & Rubber Co., the McLaren Rubber Co., and the Doss Rubber Co.

Clifford H. Oakley, president of the Essex Rubber Co., says the demand for rubber heels and soles continues on a large scale. The plant is running to capacity and recently completed an addition to take care of extra work.

The Spartan Rubber Co., Yardville, under the factory management of Karl Kavanaugh, is running to maximum capacity, and is now considering adding additional buildings to take care of increased demand.

Herbert W. Kugler and Henry L. MacGregory, who pleaded guilty to misappropriation of funds from the Globe Rubber Tire Co., are now being sued by that company—Kugler for \$7,500 and MacGregory for \$8,000, with interest charges in both cases. Kugler has paid back \$12,500 of the \$20,000 he was accused of having taken, but MacGregory, similarly charged with having taken \$8,000, has not made restitution thus far.

C. Edward Murray, Jr., head of the Murray Rubber Co., reported that garden hose shipments have been very heavy since

the first of the year and that it is impossible to fill orders at this time. The company is also behind in tire and mechanical goods orders.

The United & Globe Rubber Corp. reports trade as being very good. The company's stock of garden and fire hose has been depleted by summer orders.

The Thermoid Rubber Co. produced tires at the old prices until a few weeks ago, when a general increase was put into effect. The company has gradually increased its force of tire makers. The brake lining department has been running to capacity for some time.

At the Trent Rubber Co. plant it was said that orders for tires and tubes had increased during the past month.

Judge Joseph L. Bodine, in the United States District Court at Trenton, has upheld the resignation of C. Edward Murray, Jr., as one of the Empire Tire & Rubber Co. receivers, to accept a position with the Murray Rubber Co., after the former company had become financially distressed and the new concern was organized.

### New Jersey

The Eberhard Faber Rubber Co., 202-214 New street, Newark, New Jersey, manufacturer of rubber bands, erasers, penholders, etc., is erecting a four-story building of concrete and steel construction with a view to largely increasing the production capacity of this well-known concern. It is estimated that the building will be ready for the installation of machinery towards the end of the summer of 1923. The new equipment will include a thoroughly up-to-date laboratory and other complete and modern features.

Finding it necessary to greatly enlarge their factory, the executives of the New Jersey Chemical & Rubber Works, Inc., Hillside, New Jersey, have recently doubled the capacity of the plant, and have been installing equipment for the manufacture of transparent rubber nipples. Operations in this new department began about May 15. Edward C. Nerolf is plant superintendent.

The Braender Rubber & Tire Co., Inc., Rutherford, New Jersey, has been incorporated with a capital of \$265,000 to manufacture tires, tubes and other articles for the rubber trade. Walter P. Braender, founder of the company, has been named agent in charge. The other incorporators are David Z. Jeselhorn, Newark; Benjamin F. Teitelbaum, Jersey City; Regina E. Donahoe, Newark.

The equipment of the Hardman Rubber Co., New Brunswick, was recently sold at auction for \$18,000. The material and equipment was sold to Whitehead Brothers Rubber Co., Trenton, and Samuel Feldman, New York, N. Y. The Atlantic Manufacturing Co., Wilmington, Delaware, purchased the hydraulic presses. The building was sold to another manufacturing concern.

The Doylestown, Pennsylvania, Chamber of Commerce has urged the residents of that place to subscribe for \$25,000 worth of bonds necessary to have the Tillinghast Rubber Company, of Stockton, New Jersey, purchase a plant and locate there. The plant at Stockton was destroyed by fire some time ago and the owners now have decided to locate elsewhere.

### SUMMER MEETING OF THE S. A. E.

The summer meeting of the Society of Automotive Engineers will be held at Spring Lake, New Jersey, June 19 to 23. An interesting paper on the "Aircushion," or "Balloon," and "Doughnut" tire, as it is sometimes called, will be read by James E. Hale of the Goodyear Tire & Rubber Co. Demonstrations and tests will be made with cars equipped with U. S., Goodrich, Goodyear, Firestone, and Fisk tires of the new type.

## The Rubber Trade in Massachusetts

### Manufactured Goods

Rubber and canvas footwear production continues as large as the available labor permits, and the output of all factories is sold well ahead. The same is true of heels and soles, especially the latter, as the sports season is just beginning. It is likewise the season for rubber toys, bathing specialties and miscellaneous novelties, for which a good demand is reported. The late, rainy spring has stimulated waterproof clothing sales, and correspondingly delayed spring tire replacement business.

New peak records have recently been made in both tire and mechanical goods production. A slackening of the automobile industry has begun to be felt by tire and automobile topping makers, though only slightly. Extensive railway equipment orders have helped the mechanical trade materially, but it is feared that these gains may be more than offset by the tendency to postpone many large building projects owing to increasing labor and material costs. This tendency affects insulated wire also, though in neither case have production schedules yet been altered to any considerable extent. Reclaiming operations continue to be satisfactory.

### Meade Plant to Be Doubled

Work has begun on the new addition to the plant of the Meade Rubber Co., Stoughton, Massachusetts, which will double its present capacity. The new building will be of brick mill construction, two stories high and 125 by 50 feet, which is one and one-half times as large as the original plant.

Most of the added space will be devoted to the cloth department, although a substantial increase in the capacity for heel output also is to be provided, the present churn room being considerably enlarged. A large increase in the number of employees will be necessary to bring output up to the increased capacity.

Almost without a break, the Meade factory has been running full time since it was built in 1916, proofing hospital sheetings, manufacturing rubber heels and specialties for the shoe trade. "Meade-Made" products are now sold throughout the country and sales offices are located in Boston, Massachusetts; New York, N. Y.; Chicago, Illinois, and St. Louis, Missouri.

### New England Tire Industry Possibilities

Of the approximately 12,000,000 motor vehicles now in use in the United States, upwards of 1,000,000 will be registered in New England this year. On the basis of three new tires and four new inner tubes for average annual replacements per car, this means 3,000,000 tires and 4,000,000 tubes. At an average of \$25 per tire and \$2 per tube, this makes \$75,000,000 and \$8,000,000 respectively, or an \$83,000,000 replacement business in New England.

Last year's estimated tire consumption was 36,000,000 units, of which 80 per cent was manufactured in Akron, Ohio, and only about 5 per cent, or some 1,800,000 tires valued at \$45,000,000 in New England by the Fisk, Hood, Converse, and United States Rubber Co. plants, and a few other factories whose production is comparatively small.

If New England tire manufacturers are as successful in 1923 in selling their products to automobile manufacturers to be placed on the new cars marketed in 1923 as they have been in the immediate past, and the same percentage applies that we find in the replacement field, there should be added to the 3,000,000 tires required for New England owned cars, 1,680,000 casings, which figure represents 25 per cent of the difference between the Akron production and that of the whole country.

Assuming that the automobile manufacturer who buys in large lots, as against the smaller sales to the New England agents of tires, pays the New England tire manufacturer on the average only \$20 per shoe, this would add to the sales revenues of the New England tire producer \$33,600,000, and with the same number of inner tubes at say \$1.50 each, this total would be increased to

\$36,120,000. The latter figure added to the \$83,000,000 which represents the approximate cost of tires and tubes for the old cars operating in New England, makes a grand total of \$119,120,000. Such a volume of sales would make it necessary to extend existing tire plant facilities in New England more than 150 per cent in order to meet the demands of New England automobile owners and those of the automobile manufacturers using in the same proportion as at present the tire products of this section.

If we assume that of the approximately 1,800,000 tires now being made in New England each year 800,000, or almost one-half, are being sold for use in this territory, which perhaps is a high estimate, it is apparent that after deducting 35 per cent as a fair estimate of the jobbers' and retailers' commissions, more than \$35,000,000 of New England money is going every year to sections of the country other than New England, principally to Ohio, just on this one commodity of automobile tires, with probably \$4,000,000 or \$5,000,000 more for inner tubes.

The New England tire industry does not measure up to New England tire requirements, and it is regarded as inconceivable that this section, which long led the American rubber industry, should surrender the tire field to Ohio without a struggle, and he suggests an intensive co-operative advertising campaign to emphasize the advantages of New England tires for New Englanders.

### Boston

Although rubber insulation played an important part in the many labor saving electrical devices of numerous makes shown at the Home Beautiful Exposition held at Mechanics Building from April 21 to May 5, the Stedman Products Co., South Braintree, Massachusetts, was the only rubber trade exhibitor. This firm had an attractive display of Stedman naturized flooring with tile, runner and wainscot effects, stair treads, bath and drain mats, table tops, etc.

The Boston Shoe Trades Club has voted favorably on the proposed new home of the club, to be located on the street floor of the United States Hotel, where a private dining room is now being used as temporary headquarters. After the necessary alterations are completed the club will have a private entrance on Kingston street, a large dining room with two private dining alcoves and a counter lunch room, a lounge, library, lobby, barber shop, pool and billiard room and toilet room with two showers. Open fireplaces will be features of several rooms.

The Boston Shoe Style Show, otherwise the New England International Shoe and Leather Exposition and Style Show, will again be held in Mechanics Building, July 9 to 12 inclusive. Major Charles T. Cahill, of the United Shoe Machinery Co., is again chairman of the exhibits committee, and W. I. Wardell, of the United States Rubber Co., Boston, is also a member. As in the past, rubber and canvas footwear, rubber and fiber heels and soles will be features of the show.

James M. Linehan, formerly in charge of the commercial department, has been promoted to sales manager of the Grow Tire Co. He first joined the Grow organization a few years ago as a salesman.

### Massachusetts

The Boston Rubber Shoe Co. has reopened its Fells factory at Melrose, which has been idle for about a year. Mostly heavy footwear with some lighter styles will be made. Henry E. Guilford will be in charge. When running at capacity the plant employs 1,100 workers.

Richard Le Barron Bowen, formerly vice president of the O'Bannon Corporation, with plants at Taunton, Massachusetts, and West Barrington, Rhode Island, is now connected with the Coated Textile Mills, Inc., Providence, Rhode Island.

The annual May party of the employees of the Boston Woven Hose & Rubber Co., Cambridge, was held in Elks Hall, Central

Square, on May 18. A bright entertainment, refreshments and dancing were much enjoyed by the large number of employees and guests present. The party was held under the auspices of the Mutual Benefit Society.

### An Attorney for the Hood Rubber Co.

An attorney to care for legal, patent, and miscellaneous executive work has become an essential member of the office staff of many leading rubber goods manufacturers. Such matters affecting the Hood Rubber Co., Watertown, Massachusetts, are in the capable hands of Edmund Stanley Kochersperger.

Born in Philadelphia, Pennsylvania, March 31, 1883, he was educated in the Hopkins Grammar School, Dean Academy, and was graduated from Yale University in 1906 and from Harvard Law School in 1910. Immediately he began the general practice of law with the well-known firm of Choate, Hall & Stewart, Boston, Massachusetts.

After seven years' experience in this office he took charge of the legal matters of the American Optical Co., Southbridge, Massachusetts, and in 1918 went in a similar capacity to the Hood Rubber Co., where he is now located and devoting much attention to taxation matters.

Mr. Kochersperger is a member of the Rubber Association of America, American Economic Association, Academy of Political and Social Science, American Academy of Political Science, and in 1920 was nominated a member of the executive committee of the Safe Roads Federation of Massachusetts by the Associated Industries of Massachusetts. The object of this federation is to reduce highway accidents through education and arousing public sentiment. His clubs and fraternities include the Elihu Club, Alpha Delta Phi, and Phi Delta Phi.

### President of the Goodyear Tire & Rubber Co.

George M. Stadelman, who in April was elected president of the Goodyear Tire & Rubber Co., Akron, Ohio, succeeding



George M. Stadelman

E. G. Wilmer, now chairman of the board of directors, has the unusual record of only two business connections in twenty-nine years in the rubber industry, twenty-one of which have been devoted to Goodyear sales.

A native of Winona, Minnesota, Mr. Stadelman started his business career with Morgan & Wright Co., Chicago, Illinois, in 1894, which he served as salesman, Philadelphia representative, and sales manager, resigning in 1901 to join the Goodyear company.

At first he was appointed manager of the solid tire sales department, and later was made general sales manager.

In 1909 he was elected secretary of the company, and in 1915 became a director through his advancement to vice president in charge of sales. In 1921 he was also made a director of the Goodyear Tire & Rubber Co. of Canada, and has recently been appointed an alternate member of Secretary Hoover's rubber investigating committee.

Mr. Stadelman's election places the direction of Goodyear affairs in the hands of an active, experienced and prominent tire man who is largely responsible for the successful merchandising methods of the Goodyear company for a score of years and will follow the firm's well established policies in this direction.

"PNEUMATIC TIRES," BY HENRY C. PEARSON. AN ENCYCLOPEDIA of tire manufacture, repair, rebuilding, machinery and processes.

## The Rubber Trade in Ohio

### Manufactured Goods

A general survey of the rubber business at the end of May shows a slight reduction in tire output on the part of some of the factories, while every other branch of the industry in Ohio continues at peak and promises to remain so for the remainder of the summer.

The reduction in output has not been in excess of 10 per cent of production as far as Akron is concerned. It is estimated that the district is now producing between 100,000 and 102,000 tires a day, as compared with 112,000 made at the peak. The first reduction in output was due to a decrease in demand for original equipment on the part of the automobile makers, but during the latter part of the month the manufacturers felt a lull in the demand from tire dealers, because of the constant adverse weather conditions. The dealers' shelves were filled with tires, and it was expected that May would see the opening of the motoring season with a constant demand for tires and replacement orders. Now every indication points to June as the opening season, when the demand for tires will immediately increase. It is this demand that will consume the surplus tires which are in the hands of the manufacturers and the dealers. This surplus is estimated to be between 1,000,000 and 2,000,000 tires above normal, but there are no fears of these not being used up in a very few months.

The footwear business has closed the most successful season experienced for many years, as every condition was propitious. The farmers are prosperous; mines and forests are being operated at a high rate, with a consequent demand for rubber footwear of all kinds. This demand was coupled with low stocks on the part of the dealers, and it is not unlikely that from now on footwear departments will be gradually adding men as they can be obtained.

The specialty manufacturers report that the parks and all recreational places are preparing for a banner year, and are therefore stocking up heavier than ever with balloons and other rubber specialties. Mechanical goods are in the same active demand as reported a month ago, with every prospect of increasing business rather than decreasing. The hard rubber business is replacing automobile parts with radio telephone business, and every indication points to a good half year. Reclaimers are also reporting a very satisfactory business.

### Half Year Financial Prospects Good

Operations on the part of the rubber industry during the second quarter will probably be more profitable than for any other similar period in the history of the industry. Reports given out by rubber companies for the first quarter of the year show larger profits than during any previous period, and for that reason the profits of the second quarter should be larger because the industry has the advantage of higher tire prices while material and labor costs are practically unchanged.

The second quarter is witnessing some slight reduction in production, brought about by a decrease in demand for the less profitable business; namely, original equipment business from automobile makers, while dealer business continues at a very high rate. However, the decrease did not come until practically half of the quarter was gone, and for that reason will not materially affect the profits.

The General Tire & Rubber Co. will probably show larger earnings for the first half of the year than during 1922, when net earnings amounted to \$100 a share on the common. The same will probably be true with the Miller Rubber Co., which showed \$35 a share, and of the Firestone Tire & Rubber Co., which showed \$16 a share. The Goodyear earnings have not been computed on a common stock basis because of the number of securities ahead of the common stock. It is not unlikely that The B. F. Goodrich Co., for the first half of the year will make a better

showing than was made in 1922, when approximately 73 cents was shown as earned on the common stock.

### Akron's Tire Production

At the present time production at the Goodyear plant at Akron is in the neighborhood of 32,000 tires a day, although combined Goodyear production in Akron, California and Canada is 42,000 tires per day. During one 24-hour period this month Goodyear produced the largest number of tires ever made by one single organization in a 24-hour period. The total production of the three plants on that day was 64,013 tires. The largest previous day's production in the history of the company was 35,780.

On this day, 48,592 tires were made at the Akron plant, 8,837 at the California subsidiary, while the Canadian plant at Toronto added 6,584. The striking feature of this production was that it was completed with just one-half the number of men which would have been required to complete the same number of tires three years ago. Goodyear during the month in all its plants made 1,029,797 tires, as compared with 910,714 in March of 1920. The Akron plant produced 800,526 tires as compared with 842,795 produced during March of 1920.

The Firestone production is now 31,000 tires a day, which is the highest number ever made by the company. The Miller Rubber Co. production is over 9,000 tires a day; The B. F. Goodrich Co., somewhere in the neighborhood of 20,000; General Tire & Rubber Co., close to 4,000; the Seiberling Rubber Co., in the neighborhood of 1,800; India Tire & Rubber Co., approximately 800; Swinehart Tire & Rubber Co., approximately 1,000 tires; Mohawk Rubber Co., in excess of 900; American Rubber & Tire Co., in excess of 800. The Akron district at present is producing in the neighborhood of 112,000 tires per day, while the total American production is estimated approximately 185,000 daily.

### Banquet at Firestone Clubhouse

Nearly 300 employees, as well as officers and executives of The Firestone Tire & Rubber Co., Akron, Ohio, met at an enjoyable banquet held at the company's clubhouse, on the evening of May 16. All the addresses given on this occasion had reference to the work of the company's Suggestion Board, mentioning the remuneration to employees as well as service to the company which had resulted from its activities.

### Tire and Rim Association Officers

The following directors and officers for the ensuing year have been chosen by The Tire and Rim Association of America, Inc., 1401-1402 Cleveland Discount Building, Cleveland, Ohio: S. P. Thacher, J. E. Hale, E. O. Fritch, J. H. Wagonhorst, W. J. Kirkpatrick, J. D. Anderson, B. Darrow, Ford Lawrence, C. C. Carlton, O. J. Rohde, W. H. Allen, C. F. Ofensend, W. B. Minch, H. W. Kranz, P. Pleiss.

Officers: S. P. Thacher, president; Geo. L. Lavery, secretary; W. B. Minch, vice president; H. W. Kranz, treasurer.

In order to insure production of uniform standard rims, the association maintains a corps of more than ninety inspectors who supervise production in the plants of rim manufacturers in all parts of the country. During 1922 there were 16,281,583 rims passed by these inspectors and stamped with the brand of the association, while during the first three months of 1923 there were 5,647,250 rims similarly approved. George L. Lavery is general manager of the association.

### The Evans Lead Co.

The Evans Lead Co., Fostoria, Ohio, established a year and a half ago by Marshall Evans, formerly vice president of the Eagle-Picher Lead Co., is at present carrying on operations at two plants, one at Fostoria, Ohio, and the other at Charleston, West Virginia. At the first-mentioned plant lead alloys and lead pigments are manufactured, while a zinc oxide plant is soon to be

erected. At the Charleston plant litharge and red lead are now being produced.

The company's general offices are in the Keith Building, Cleveland, Ohio. Other executives of the organization include L. E. Wemple, vice president; and H. J. Hayden, secretary and treasurer.

### Seiberling Report Encouraging

According to the report made March 12 at the annual meeting of the stockholders of The Seiberling Rubber Co., Akron, Ohio, the company's sales for 1922 totaled \$3,845,779.55, while the net profits are estimated at \$56,878.87. These figures are considered especially encouraging as during the period under consideration tire prices in general reached a very low level.

With the exception of the appointment of B. O. Etling as a director, succeeding George W. Crouse, no change has been made in the company's executive personnel, which now includes the following:

Directors: F. A. Seiberling, C. W. Seiberling, W. S. Wolfe, H. L. Post, W. A. M. Vaughan, B. O. Etling and George T. Bishop.

Executive Officers: F. A. Seiberling, president; C. W. Seiberling, vice president in charge of purchases; W. S. Wolfe, vice president in charge of production; H. L. Post, vice president in charge of sales; W. E. Palmer, secretary; W. A. M. Vaughan, treasurer.

### An Expert in Rubber Chemistry

Robert C. Hartong, chemist and manufacturer of chemical products, was born July 31, 1886, in Burghill, Ohio. He attended Scio College and in 1909 was graduated in chemistry from the University of Pittsburgh, Pennsylvania.



Robert C. Hartong

Later that year he joined the staff of The Goodyear Tire & Rubber Co., Akron, Ohio, as a laboratory chemist and his advancement was rapid. He became a compounding chemist in 1910, took charge of the compounding department in 1911, was made assistant chief chemist in 1915 and chief chemist in 1917.

He resigned his position in 1921 to organize the Rubber Service Laboratories Co., Akron, Ohio, of which he was made president. This firm combines a consulting service

with the manufacture and sale of accelerators, colors, and other compounding ingredients. In March, 1922, Mr. Hartong also organized and became president of the Chemitex Products Co.

He is a member of the American Chemical Society, Akron Engineering Society, Akron Chamber of Commerce, Akron University Club, Phi Delta Chi Fraternity and the Fairlawn Heights Golf Club.

### Akron

The following officers and directors of The B. F. Goodrich Co. were reelected at the annual meeting of the company: B. G. Work, president; W. A. Means, vice president; C. B. Raymond, vice chairman of the board of directors; W. O. Rutherford, vice president in charge of sales; W. C. Geer, vice president in charge of development; H. K. Raymond, vice president in charge of production; P. C. VanCleaf, secretary; L. D. Brown, treasurer, and Harry Hough, comptroller. Other members on the directorate are H. E. Raymond, P. H. Mason, A. H. Noah, C. C. Goodrich, D. M. Goodrich, E. C. Shaw, A. A. Tilney, Weddill Catchings and Harold Stanley.

The India Tire & Rubber Co. profits for the year, thus far, were larger than for any period in the history of the company. During May the company also produced the largest number of tires ever made in one day, when the output was in excess of 700 tires a day. Its dealer business is rapidly increasing, while its export business is also showing improvement.

T. E. Smith, founder of the *India Rubber Review* and president of the Standard Savings Bank, who has been confined to the hospital for several months, following an accident, has been moved to his home. It will be several weeks before Mr. Smith will again be able to return to business.

During the month the Renail Aluminum Heel Co., which will produce an aluminum heel with a rubber tip, located in the city. Between 20 and 25 men will be employed as soon as full production is reached. At the present time the company is located in leased property on East Crosier street.

Elmer G. Wilmer, chairman of the board of directors of the Goodyear Tire & Rubber Co., has gone to Europe for several months. Mr. Wilmer took Fred Climer of the labor department with him and it is believed that a study of the European labor situation will be made.

The Miller Rubber Co. states that there are now approximately 200,000 automobile tire dealers in the United States. The same company estimates that at the present time approximately 125,000 men are employed in the building of tires in the United States.

Construction of an addition to the plant of the Miller company is now under way. The new building, four stories in height, will measure 97 by 285 feet.

Although operating for the past two years, the Good Rubber Co., Akron, Ohio, was only recently incorporated for the purpose of manufacturing toy balloons, druggists' rubber sundries, and mechanical rubber specialties. W. D. Good, president of the organization, has had much experience in rubber manufacturing, having formerly held responsible positions with the Goodrich, Miller, Wooster, Lincoln, and other rubber companies. Other officials connected with the Good organization include S. M. Good, vice president; J. B. Good, secretary; and E. N. Good, treasurer.

### Ohio

The Chemitex Products Co., Mogadore, formed by R. C. Hartong and C. O. North several months ago, will begin manufacturing specially treated liners for use in rubber factories in the very near future. The company started in the production of specially prepared window shade cloth, and is going into the new business on the basis of probably 2,000 yards of liner material a day.

The Ashland Tire & Rubber Co. has been purchased by a group of Ashland business men who plan to continue under the same name as formerly the manufacture of cord tires. A new charter under the laws of Ohio has been taken out, the organization being capitalized at \$300,000. C. D. Darrah is president.

Excellent prospects for doubling during 1923 the sales records for 1922 is the report of The Standard Tire Co., Willoughby, Ohio. The organization has met with success in developing a black tread tire which is said to give unusual mileage. R. J. Firestone is president.

The Star Rubber Co. recently reported net profits of \$139,196 on net sales of \$1,514,362 during the year ended December 31, 1922. Inner tube production showed an increase of 149 per cent in units for the year; tire sales showed an increase of 46 per cent, while all sales increased 36 per cent. At the annual meeting the following officers were named: L. H. Firey, president and general manager; R. L. Robinson and W. A. Humphreys, vice presidents; J. W. Dessecker, secretary and assistant treasurer; R. S. Saalfeld, treasurer; J. A. Christie, general superintendent,

and R. G. Shirk, assistant secretary. The directors include the officers of the company and Francis Seiberling and William A. Boesche.

The Republic Rubber Co., Youngstown, Ohio, was acquired last month by the Lee Rubber & Tire Co., Conshohocken, Pennsylvania, headed by John J. Watson, Jr. The Republic Co., one of the oldest rubber manufacturing concerns in the country and which was several years ago placed in the hands of a receiver, will be reorganized into a new Ohio corporation, retaining, however, its present name, and continuing the manufacture of Republic products, which include cord and special tread tires, solid truck tires, belting, hose, packing, rubber heels, etc. The stock of the reorganized concern will be owned by the Lee Rubber & Tire Co.

## The Rubber Trade in the Midwest

### Manufactured Goods

General conditions in the midwest rubber trade show a slight falling off in demand. While mechanical goods and druggists' sundries are holding fair, tire sales continue good. The large rubber companies are all optimistic of the outlook despite a slight curtailment of auto production in Detroit with the exception of the Ford plant. Collections and payments on statements due from tire dealers were very good and are coming in promptly, thus showing a sound condition. The opinion in the trade is that July, August, September, and October will witness active buying and more business will be done in those four months than during the preceding eight months. Late weather has hampered both rural and city sales of tires, which will result in later summer and fall buying.

### Illinois

Gus Lund, formerly with The Miller Rubber Co., has been appointed traveling representative for the State of Illinois for The General Tire & Rubber Co., working out of the Chicago branch office.

The Chicago branch of The Firestone Tire & Rubber Co. has opened warehouse distributing points in the following localities: Rockford, Illinois, Decatur, Illinois, South Bend, Indiana, and Peoria, Illinois. Orders received from the Chicago territory are shipped from the nearest warehouse.

The Indiana Rubber Products Corporation, with executive offices at 10 South LaSalle street, Chicago, Illinois, has recently purchased at Huntington, Indiana, the plant formerly occupied by the Rapid Rim Co., and plans to remodel the buildings for the manufacture of automobile tires. The most modern types of equipment will be secured, and when completed the plant will have a capacity of 5,000 tires daily. C. H. McDermott is president.

Announcement is made of the consolidation of the Vogue Rubber Co., manufacturer of Vogue hand built tires, and Woodbury, Inc., who has been producing the Woodbury "Custom Built" tires. The new firm will occupy the entire building at Twenty-fourth street and Indiana avenue, Chicago, Illinois, carrying on operations under the name of The Vogue-Woodbury Rubber Co.

The Dryden Rubber Co., manufacturers of mechanical rubber goods, 1014 South Kildare avenue, Chicago, Illinois, has filed plans for a one-story addition, 70 by 180 feet, estimated to cost about \$50,000.

Mortgagee sale of the belongings of The Lincoln Highway Tire Co., manufacturers of reliners, tires and tubes, scheduled for May 16, at Fulton, Illinois, was deferred and will be held at a later date.

M. & L. Rubber Co., 3025 Indiana avenue, Chicago, Illinois, has been incorporated for \$20,000, and will manufacture and deal in

tires, and other rubber goods. The incorporators are: A. B. Legnard, W. M. Legnard and A. E. MacGregor.

### Michigan

The Saint Clair Athol Rubber Co., capitalized at \$500,000, is a recent Michigan incorporation, organized to manufacture automobile top fabrics, do general coating and spreader work, rubberizing fabrics for the raincoat trade, hospital work, etc. The company's factory is at Marysville, Michigan, while the main offices are at 440 Jefferson avenue, East, Detroit, Michigan, where all buying and selling for the organization are in the hands of H. Scherer & Co. Executives of the Saint Clair Company include Hugo Scherer, president; Clemons H. Davis, vice president; Lovell R. Kraus, treasurer; Hugo Miller, secretary; and C. J. Strobel, factory manager.

### Indiana

The plant formerly owned by The Majestic Tire & Rubber Co., Indianapolis, Indiana, has been recently purchased by a corporation headed by J. D. Wiggins, president and general manager of The International Rubber Company of America, Anderson, Indiana. With the installment of more machinery the output will be 600 tires and 1,000 tubes daily. Production began May 7. At the Anderson plant 1,000 tires a day are being manufactured and here also new machinery is being installed, which will bring the daily production up to 1,500 tires. The two plants, except in the purchase of supplies, will be operated independently. The officers are: J. D. Wiggins, president and general manager; S. T. Davis, vice president; Parke G. Haynes, secretary and treasurer; and H. W. Lantz, factory manager.

## The Rubber Trade on the Pacific Coast Manufactured Goods

That striking oil is not always an unmixed blessing has recently been impressed upon the rubber trade of the Pacific Coast. Drilling for oil had been carried on with such success that makers and dealers in belting, valve inserts, hose, and other rubber supplies for the oil fields were doing a profitable business. The big refining companies, however, found that oil was being produced faster than they could market it and many wells have quit pumping. Result, a slump in rubber supplies.

General trade conditions on the Pacific Coast are excellent. A recent survey showed that retail trade sales averaged 20 per cent higher than a year ago, and with stocks scarcely any larger. Wholesale sales averaged slightly over 25 per cent better. Business failures have been much fewer. Building operations for May were said to be 170 per cent better than in May, 1922. All the coast factories making mechanicals are on full time and some of them working night and day, with a larger force of workers than a year ago. While the oil fields are temporarily slowing up, the mines are redoubling their activities, and conveyor beltings and other rubber goods for mines are in strong demand. The paper mills in Oregon are very busy and have lately been in the market for large rubber rolls.

### San Francisco

The American Rubber Co., Park avenue and Watt street, Oakland, with San Francisco offices at 417 Market street, has been running two shifts a day on heavy transmission and conveyor belting, heavy hose, and various mechanicals, and no let-up is in sight. The company recently installed some new 48-inch mills and completed a large addition to be used for hose making.

J. M. Alderfer, president of the India Tire & Rubber Co., Akron, Ohio, has recently been looking over the coast territory.

The Corduroy Tire Co., Grand Rapids, Michigan, has appointed E. G. Vestal, one of the most experienced tire men on the coast, as western district manager, with headquarters in San Francisco.

"Busier than ever" is the report from the Pioneer Rubber Mills, Pittsburg, Contra Costa County, California, the main office of which is in San Francisco. The company has finished building a large reinforced concrete warehouse, and has recently turned out a great quantity of garden hose, for the making of which the concern has one of the finest presses in the country.

The C. Kenyon Co., Brooklyn, New York, will conduct its own retail business in San Francisco, according to Jay Hirsch, Pacific Coast manager. John P. Costello, well-known tire and tube man, will be district sales manager and in charge of all retail sales.

Under the direction of Ralph Daniels, Goodyear branch manager for San Francisco, several of the newly appointed dealers selected by the Goodyear Tire & Rubber Co. of California were entertained for two days by H. A. Price, Goodyear branch manager at Los Angeles, the trip to the latter place being made by motor. In the party were George Lehre, Harry H. Kahn, W. S. Cox and S. F. McKean.

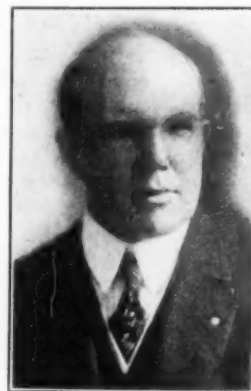
### Thirty Years in the Rubber Business

Fred S. Wilson, vice president and Pacific Coast manager of the Thermoid Rubber Co., of Trenton, New Jersey, who on March 1 took up oil refining in Los Angeles, has been connected with the Thermoid concern and the Stokes interests for thirty years.

Beginning as a bicycle tire maker when a 16-year-old boy, he spent two years learning shop operations. The following three years he sold goods in New York City, followed by three years as factory office manager. Next he was on the road in the eastern states for five years, and then for five years he was sales manager and advertising manager, being largely instrumental in launching the publicity campaign that has since made Thermoid brake lining known in every city in the world.

With the completion of the Panama Canal, the Thermoid Company decided to actively develop business on the Pacific Coast and Mr. Wilson was placed in charge of that territory, he having just established the Thermoid business very firmly in the Middle West. During the past eleven years he has built up an extensive trade in the far west, with headquarters in Los Angeles.

As head of the new East-West Refining Co., Mr. Wilson may not be active in the rubber trade, but it is quite likely that he will remain vice president of the Thermoid Company, a position he has held for fifteen years. Sixty years ago Mr. Wilson's father went to work with W. J. B. Stokes' father when he was 13 years old, and later in business for himself and employed W. J. B. Stokes, who later went into business, employing Mr. Wilson.



Fred S. Wilson

### Los Angeles

The West American Rubber Co., Los Angeles, is exceptionally busy making various staple rubber mechanical goods and many specialties, and has recently been forced to put its office into a new building to allow for shop expansion. A specialty being turned out in large quantities is a slush pump valve of unusual toughness and resiliency.

The factory branch of the Pioneer Rubber Mills, now at 223 South Los Angeles street, Los Angeles, will be moved in July to a building recently erected by the company at 822 East Third street. It measures 60 by 120 feet, has a spur connecting with railroads nearby, and will provide for a much larger stock of

goods than now carried. The sales force under Manager J. D. Horan will be practically doubled.

The Los Angeles Rubber Co., 124 East Third street, Los Angeles, one of the largest retail and wholesale rubber distributing concerns, has been appointed exclusive southern California agent for the Lucerne Rubber Co., Trenton, New Jersey, manufacturers of hard rubber specialties.

The Mohawk Rubber Co. has leased a new brick building at 1920-24 Santa Fe avenue for its Los Angeles factory branch.

J. P. Schiller has become associated with The India Tire & Rubber Co., Akron, Ohio, as its southern California representative. Mr. Schiller will make his headquarters in Los Angeles.

Sidney A. Ogden, well-known rubber chemist, of Los Angeles, who recently returned from the conference of the American Chemical Association at New Haven, Connecticut, has again gone East on business.

Of interest to the tire trade is the fact that 22,215 passenger cars and trucks were sold in California during April, or 8,586 more than in April, 1922, or a percentage increase of 62. The March, 1923, registration was 23,898.

The Los Angeles Rubber Stamp Co. is putting up a new building at Los Angeles and Fifteenth streets, to cost about \$500,000. The concern is one of the oldest of its kind in the West.

Elmer S. Firestone, manager of the Los Angeles branch of the Firestone Tire & Rubber Co., has been advised that his branch leads the company's sixty-two United States branches in volume of business. He expects to have as his guest next month President Harvey S. Firestone, head of the noted rubber company.

Adolf Schleicher, president of the Samson Tire & Rubber Co., of Compton, adjoining Los Angeles, has left for the East, where he expects to make several important trade connections.

An automobile accessory company operating seventy stores in the West has contracted for a considerable part of the output of the Reilly Rubber Co., of Los Angeles, manufacturers exclusively

C. J. Reynolds; secretary and treasurer, Earl Wyvell. Lee Coggin is in charge of stock sales.

Cliff Slusser, the first factory plant manager of the Goodyear Los Angeles plant and now chief staffman to Paul W. Litchfield, vice president and general manager of the Goodyear factory in Akron, with R. F. Dinsmore, chief chemist of the Akron plant, recently spent a week in conferring with H. E. Blythe, present manager of the Los Angeles plant. Production now averages 4,800 tires and 5,000 tubes daily.

A new warehouse at 2020-2030 Bay street has recently been secured for the Los Angeles, California, branch of the L. H. Butcher Co., Inc., 239 Front street, New York, N. Y. The new building which supplies 45,000 square feet of floor space, is said to be the largest warehouse on the Pacific Coast devoted exclusively to the handling and merchandising of colors and chemicals.

### The Southwest

Thomas Clements, who recently resigned as vice president and comptroller of the Firestone Tire & Rubber Co., Akron, Ohio, has assumed the management of the cotton ginning and cottonseed oil plants in Arizona, which he and C. H. Bencini, representing a San Diego syndicate, recently acquired from the Firestone company.

Another aggressive advertising campaign has been entered upon by the Spreckels "Savage" Tire Co., of San Diego, California, and a flood of orders for the new type of tires is said to be looming. The Spreckels concern is exceptionally well equipped and well managed.

### The Northwest

The Jack Tire & Rubber Co., Spokane, Washington, has been doing a large business in making casings and tubes in its new and up-to-date plant. It has established in the Northwest over 250 tire service stations, and tire sales for the first 45 days of 1923 were equal to 0.4 of the whole 1922 output. Enough space



The Jack Tire & Rubber Co., Spokane, Washington

of red rubber tubes. The Reilly concern started operations May 15, 1922, and is now making close to 500 tubes daily.

Another unit, 75 by 120 feet, of steel and brick, and opposite the old factory, is being erected by the E. M. Smith Co., rubber and asbestos manufacturers, on Clarence street, Los Angeles.

The Golden State Super Cord Tire Co., capital \$100,000, and with headquarters in Los Angeles, is one of the newest bidders for the steadily growing coast trade. The officers are: President, Frank T. Price, of the tire firm of Nelson & Price; vice president,

and equipment have been provided for a considerable increase in production. W. E. Greer is factory superintendent and H. A. Jurgewitz is sales manager. The officers are still as originally: President and general manager, T. G. Richards; vice president, R. C. Lammers; secretary and treasurer, John B. White.

The United States Rubber Co. has added Eastern Washington, Northern Idaho, and Montana to the territory served by its Spokane branch, looked after by Elmer White. Five salesmen more have been added to the force.

## Rubber Trade Inquiries

*The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.*

(203) Inquiry is made for addresses of jobbers or firms handling cotton flock and linters.

(204) We are asked for names and addresses of companies making low-priced rubber heels.

(205) A reader is interested in obtaining waste of a fibrous nature, obtained from cactus leaf or other substance; also silk waste.

(206) Names and addresses are desired of manufacturers of wading pants, and pants and rubber boots in combination.

(207) We are asked for the address of the manufacturer of "Eversafe" Pacifiers.

(208) A correspondent in Sweden wishes the addresses of manufacturers in the United States handling rubber goods in general, proofed goods, babies' pants, rubber aprons, etc.

(209) We are asked to give addresses of manufacturers of equipment for carrying ground tubes from the pan of the mill to the top of the roll when grinding these fine for reclaiming.

(210) Inquiry is made concerning a machine to make hollow balls without a reinforcing cord.

(211) An inquirer wishes to get in touch with manufacturers of braiding machines for making 1 in. to 1½ in. cotton hose. A very compact loom which will take up little space and operate at high speed is desired.

## Foreign Trade Opportunities

*Addresses and information concerning the inquiries listed below will be supplied to our readers through the Foreign Trade Bureau of The India Rubber World, 25 West 45th street, New York, N. Y. Requests for each address should be on a separate sheet and state number.*

(6253) Mechanical tire inflation equipment for garages—France. Purchase or agency.

(6254) Pneumatic and solid rubber tires—Morocco. Agency.

(6273) Rubber bathing caps and novelties—Canada. Agency.

(6274) Rubber belts, rubber tires, low-priced hosiery, paints, hardware, automobiles, etc.—India. Purchase.

(6275) Rubber goods, including hot water bottles and rubber gloves—Norway. Agency.

(6297) Sundry goods, including motor-car tires—Ceylon. Purchase.

(6335) Rubber boots, principally for fishermen, fishermen's oilskins, rubber hats and gloves, rubber coats and slickers, in large quantities—Canada. Agency.

(6365) Rubber (balata) transmission belts, asbestos products, emery products and fibers—Poland. Agency.

(6376) Automobiles and accessories, tires, leather and rubber boots and shoes, typewriters, and sundry other goods—Hungary. Purchase and agency.

(6377) Light weight medium priced motor cycles, motor bicycles and accessories—New Zealand. Purchase and agency.

(6410) Automobile tires of well-known make—Australia. Agency.

(6411) Rubber overshoes—Norway. Agency.

(6412) Tennis shoes (white cloth shoes with rubber soles) and chewing gum—Italy. Agency.

(6413) Tires and automobile accessories—Egypt. Agency.

(6461) Elastic goods, etc.—Netherlands. Agency.

(6468) Men's garters and suspenders, drygoods novelties, etc.—Mexico. Agency.

(6479) Motor cycles, motor cars, motor boats, and accessories, tires, etc.—Madeira. Agency and purchase.

## Trade Lists Available

Mimeographed copies available on reference to titles and file numbers.

Rubber goods, importers and dealers, Dominican Republic—L.A.-32019.

Rubber goods, manufacturers, Canada—BE-1032.

Rubber goods, importers and dealers, China—FE-13067.

Rubber goods, importers and dealers, Japan—FE-11046.

Rubber goods, importers and dealers, Tunis—EUR-3002-A.

Sporting goods, importers and dealers, Canada—BE-1033.

Sporting goods, importers and dealers, New Zealand—FE-24029.

Rubber goods, importers and dealers, Netherlands East Indies—FE-19035.

Rubber goods, importers and dealers, India—FE-21036.

Rubber goods, importers and dealers, New Zealand—FE-24026.

Rubber goods, importers and dealers, Australia—FE-23043.

Rubber goods, manufacturers, Australia—FE-23044.

Rubber goods, manufacturers, Belgium—EUR-1027.

Rubber goods, manufacturers, Italy—EUR-6031.

## Foreign Tariffs

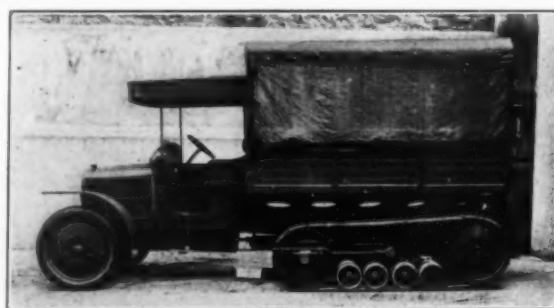
The Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., has recently issued the following special circulars regarding foreign customs tariffs:

Circular No.	Country	Articles
148	Venezuela	Rubber Goods
156	Union of South Africa	Boots, Shoes, and Tires
157	Persia	Rubber Goods
158	Siam	Rubber Goods
159	Mesopotamia	Rubber Goods
160	British Malaya	Rubber Goods
171	Denmark	Tires and Tubes
181	Portugal	Rubber Goods
183	British West Indies	Rubber Goods
185	Spain	Tires and Tubes
186	British Honduras	Rubber Goods
187	Newfoundland	Rubber Goods

Further particulars can be obtained from the Foreign Trade Bureau of THE INDIA RUBBER WORLD, 25 W. 45th street, New York, N. Y.

## VARIOUS USES FOR CITROEN CATERPILLAR TREAD

The rubber and fabric caterpillar tread which formed part of the equipment utilized by the Citroën automobile fleet in its recent crossing of the Sahara Desert, is in still other instances now being found applicable. It is now forming part of the equipment not only of trucks and automobiles, but is found particularly useful



The Citroën Caterpillar Truck

in traveling through deep snow, or in other difficult conditions. The Citroën invention is also being utilized by the French army, where it has been found practicable in carrying forward certain field maneuvers.

REPLETE WITH INFORMATION FOR RUBBER MANUFACTURERS.—H. C. Pearson's "Crude Rubber and Compounding Ingredients."

## The Rubber Trade in Great Britain

By Our Regular Correspondent

### Institution of Rubber Industry

A COMPREHENSIVE and valuable paper was read by Dr. D. F. Twiss, of the Dunlop Rubber Co., Limited, on "The Value of Rubber Pigments," before the London Section on April 9. It was common in the trade, he said, and especially in America to include in the term "pigment" chemicals or drugs which could not be used in the paint trade. The property of minuteness of subdivision, so important in paints, was equally important in rubber compounding, and it is this consideration which has led the rubber manufacturer to apply the term pigment to material of great fineness independent of its coloring association.

Pigments for surface application did not come under review in the paper, but only those used in compounding. The author's references to the history of compounding show how very few bodies are in use to-day which had not been adopted in the early days of the industry, though certainly some which were favored by Hancock have been dropped. He made the pertinent point that contrary to what is widely supposed outside the trade, compounding is a necessity and not an act of substitution or adulteration. Zinc oxide and carbon black were essential to the tire industry which largely owed its present position to them, and they were used as largely when their price was higher than that of the best raw rubber.

Referring to organic pigments and the well-known difficulty of using such with the hot cure Dr. Twiss said that the progress of industrial organic chemistry was such that the production of stable organic colors which would stand hot vulcanization might be confidently predicted. The value of a pigment for rubber depended upon its refractive index; thus, though they look white enough, magnesium carbonate, china clay and calcium sulphate are of no use in making white rubbers. White precipitated oxide of titanium was spoken of as of considerable promise for the rubber industry.

Included in a list of the pigments commonly used in the rubber industry is barium sulphate, which under the term of barytes or blanc fixe is of course largely used. Barytes is the natural mineral ground to a fine powder, while blanc fixe is chemically prepared by precipitation from solution. This is of a higher price than the ground and its advantages seem to have been appreciated more in the paint than in the rubber trade, though it has been definitely shown to give a superior rubber owing to its greater fineness.

The paper contained some interesting remarks on the chemistry of the blacks, a subject, by the way, which is now engaging the attention of the Rubber Research Association. The novel suggestion was thrown out that carbon black might be formed in the rubber during vulcanization by the decomposition under heat of an organic compound, the opinion being expressed that carbon in the nascent condition might be in an exceptionally desirable form for "reinforcing" the rubber. In referring to golden sulphide of antimony Dr. Twiss referred to the publication of recent papers on its composition and stated that as a rule it was far from being a definite chemical substance. There was no recognized standard of composition, though a content of about 15 per cent of free sulphur was fairly general. The proportion of trisulphide and pentasulphide varied considerably in different makes, and alteration also took place during vulcanization.

In conclusion he said that progress in the production of new pigments would be slow because of the conservatism of the rubber manufacturers and because of the difficult conditions to be satisfied.

Dr. Schidrowitz, who was in the chair, said that the paper struck a new departure in the proceedings of the institution as

it embodied recent scientific research and was not merely a lecture or a trade discussion. He asked if the author was sure that the arsenic trisulphide now coming into greater use as a yellow pigment contained no free sulphur of any kind. A prominent contributor to the discussion was G. C. Lewis, director of the Columbian Carbon Co., Limited, large producers of carbon black. Gas black, he thought, was like zinc oxide, crystalline, and it had also abrasive qualities which were certainly of some use. Latex had greater force of penetrating cotton than coagulated rubber had, and they had found in America that they could get better results with it, particularly for tires.

### Manchester Section Meeting

At the Manchester Section meeting in April H. C. Young gave with lantern illustrations a synopsis of the lengthy paper he gave on "Rubber Machinery" at the Institution of Mechanical Engineers in London. Daniel Adamson, a prominent local engineer, was in the chair and there were a good many engineers present, though the rubber machinery engineers were by no means fully represented. They had one or two spokesmen, however, who agreed that too much blame was attributed to them by the author and rubber manufacturers for not making enough progress, whereas they were always hampered by the non-cooperation of the rubber trade.

Mr. Young in his remarks said that the engineer was as bad as the rubber manufacturer as regarded secrecy, and this the course of the discussion tended to emphasize. As the paper has been reproduced in full both in the engineering and rubber press I shall here refer only to the comments the synopsis of the evening inspired.

Mr. Brooking agreed about the slowness of the engineers, but it must be remembered, he said, that they had no means of actually testing the working capacity of a new machine. It was this condition of affairs which led the cable makers to make their own machinery. He thought it would lead to progress if the Dunlop Company made their own machinery. The author referred to the prevalence of the multiple-story factory in America as compared with the single-story in England, but Fordyce Jones remarked that recent observations had shown him that the Americans were now building factories of only two stories. Ideas in any industry, he said, have always come from outside, but in England any man with a good idea was put down as a crank. In making rubber solution a good deal of unnecessary power was used in England compared with American practice.

Other speakers approved of the single-story mill and the chairman said that though it was more difficult to heat, this was not such an important matter in our climate as it was in America.

A speaker said that in America a worn out machine was always scrapped, while in England a worn out mixing mill was turned over to some other use, such as warming up, for which it was quite unsuitable. In one American factory there were 250 autoclaves, more than in the whole of the British Isles. In his reply at a rather late hour Mr. Young said that engineers would get more from themselves than from manufacturers. In the past they had lost by following the foolish ideas of the manufacturers who did not understand the fundamentals of machinery.

### St. Helens Company to Have a New Plant

The interesting announcement is made that the large mechanical transport factory erected towards the end of the war at a great expense at Slough, near Windsor, has been taken over by the St. Helens Cable & Rubber Co., Limited, and the whole business now carried on at Warrington, Lancashire, will be trans-

ferred thither at no distant date. The change over is to be superintended by G. A. Martin, late general manager of the Isleworth Rubber Co., who has had previous experience of such work, notably in the move of the Dunlop Company from Aston Cross to Fort Dunlop. The new factory with land adjoining covers 200,000 square feet and has good railway facilities, and the greater part of it is under one roof.

#### Another Peachey Company Organized

A company has been formed with the title of Peachey Leather Products, Limited, with a nominal capital of £150,000 to acquire an exclusive license to use and exercise in the United Kingdom the Peachey process for cold vulcanization as applied to mixtures of rubber and leather. The articles also state that the company may manufacture and deal in all kinds of leather and other goods. The directorate follows old established procedure, as it contains the names of Lord Gainford and Lord Daryngton—a recent Postmaster-General, both of whom belong to the well known Pease family, of Darlington, coal and iron masters.

#### Receiver Appointed for P. Frankenstein & Sons

At a time when it seemed that reverses in trade owing to the slump were a thing of the past comes the appointment of a receiver on behalf of the debenture holders of P. Frankenstein & Sons, an old established and well known firm of waterproofers whose works are at Newton Heath near Manchester. Established in 1854, it was converted into a limited liability company in 1903, with a capital of £50,000, 20,000 being preference and 30,000 ordinary shares. The debt in respect of mortgages and charges is £30,000.

#### Financial

The accounts of J. Mandleberg & Co., Limited, for 1922 showed a net profit of £67,683, against £22,414 in the preceding year, and with £65,936 brought in, the available balance was £133,619. A dividend of 10 per cent, the same as last year, has been declared on the ordinary shares. At the meeting the chairman, Sir Charles Mandleberg, referred with satisfaction to the improvement shown in the last year, mostly due to home trade, foreign business being still under a cloud. There were indications, he said, of improved trade generally and in their own business the present year's volume exceeded appreciably that of the same period last year. Their resources and capital had not been fully employed, the new capital obtained some years ago not yet having been employed in the extensions and developments that had been under consideration. They had a variety of operations, including rubber proofing, rain proofing, weaving cotton union and worsted dyeing, and the diversity of their manufacturing interests generally put them in a strong position to meet any demand which arose. At the conclusion of a speech on the political situation Sir Charles said that America must come in to help settle up as she came into the war. If the investment capacity of the United States came into cooperation with the productivity of Europe the wheels of industry would soon be moving again.

The report of the North British Rubber Co., Limited, for 1922 shows a profit of £83,897 on the year's working, making with the balance brought forward a sum of £90,257 for disposal. After allowing for depreciation, preference interest, taxes, etc., £26,699 remains for payments of preference interest and for a 2½ per cent dividend on the ordinary shares, leaving £8,574 to be carried forward. A considerably increased business was done over 1921, but many difficulties, the report states, had been met with besides the abnormal weather and keen foreign competition.

ALEXANDER JOHNSTON, MANAGING DIRECTOR OF THE NORTH BRITISH RUBBER CO., Limited, has been recently elected senior vice president of the Edinburgh Chamber of Commerce. Main offices of the North British organization are at North British House, 204 Tottenham Court Road, London, W. 1, England.

## The Rubber Trade in Europe

By Our Regular Correspondent

### France

French tire exports in 1922, although slightly heavier than in 1921, constituted about a four per cent decreased percentage of the total world export tire trade. Exports of rubber footwear decreased from 4,533 metric tons in 1921 to 2,337 metric tons in 1922; belting, hose and packing from 1,701 to 1,316 tons; and waterproofed clothing from 426 to 195 metric tons. France led the other countries of the world in her exports during 1922 of rubber tires, these being valued at \$23,700,000, or 31.8 per cent of the whole. The United States with exports totaling 28 per cent followed, with the United Kingdom third on the list.

There are in France at the present time about 100 rubber manufacturing firms employing 60,000 workers, and with a capitalization of more than 1,000,000,000 francs. Much affected, however, by the recent universal business crisis, and suffering from a scarcity of benzol, the tire industry of the country is only just beginning to recover, although prospects along certain other lines are more favorable. The French Michelin Company is now turning out 10,000 tires a day, two-thirds of which are for the export market. Surgical supplies of various kinds are produced in France, these being of excellent quality. A large part of such goods is prepared for export. French manufacturers turn out waterproofs of better cut and quality than those produced in England, and they have developed an export market for these goods in Belgium, Holland, and the Scandinavian countries.

From the United States are imported in considerable quantities insulators, telephone receivers, fountain pens, erasers, sponges, etc. Men's garters are almost wholly imported from the United States. Rubber boots, used only in the country districts, are imported from the United States and England, French manufacturers being able to supply only about 25 per cent of the demand. France represented during 1922 the leading purchaser of our leather cloth or artificial leather, taking goods valued at \$441,246. Quebec and Ontario followed at \$256,611; Australia at \$222,308; Sweden at \$114,071; and England at \$108,237. The total amount exported by the United States was valued at \$1,888,791.

### Antwerp Rubber Sale

The Bunge Company, of Antwerp, sold on February 6, for account of the government, wild and plantation rubber yielding 405,000 francs. The plantation of Yangambi, Stanleyville, had sent for this sale 467 packages of rubber. The net receipts on this were 267,009 francs. As the average price for the plantation rubber received was around 13 francs per kilo, and the rubber costs the government between 3 and 4 francs per kilo, the net profit per kilo amounted to 9-10 francs, which causes the *Bulletin de l'Association des Planteurs* to point out what wonderful profits Belgian companies would have reaped if they had only paid more attention to planting of Hevea in the Congo, where labor is cheap compared with the Far East.

### Italy

Italy exports to England, through France, large quantities of automobile tires. During the first nine months of 1922 these exports totaled 1,966.8 metric tons, while French transshipments to England for the entire year amounted to 2,352.2 metric tons. It is said that Michelin is shipping to England from the Italian factory, and that the Pirelli Company gets only a small share of the Italian export tire trade.

### Germany

The report of the Asbest und Gummiwerke Alfred Calmon A.-G., Hamburg, contains comparative figures of wages in 1914, 1920, 1921 and 1922. The wages paid for 10,000 kilos of finished rubber goods in 1914 amounted to 5,361 marks; in 1920, 60,040

marks; in 1921, 69,577 marks; in 1922, 626,218 marks. The asbestos factory figures for the same years were 389 marks, 7,800 marks, 13,060 marks and 122,810 marks, respectively. Of the total expenditures of the firm 76.9 per cent accounted for salaries and wages, 14.8 per cent went for taxes and similar charges, while the portion of the shareholders was only 8.3 per cent.

The prices paid for rubber during the year 1920 ranged from 83.50 to 4,539 marks a pound for plantation rubber, and 101 to 4,184 marks per pound for fine Pará. Raw asbestos, No. 1 grade, costs from 305 to 4,875 marks a kilo! The company's net profits for the year amounted to 55,715,642.48 marks.

The Hannoverische Gummiwerke Excelsior A.-G. Hannover-Limner reports a very satisfactory state of affairs. The growth of the firm is indicated by the fact that while in 1913 and 1914 an average of 3,500 persons were employed by it, the figure at present approaches 6,000. The output has doubled since 1913 and the works have been improved and new and up-to-date equipment has been installed. The company had no difficulty in obtaining raw materials, although during the year the dollar rose from 186.75 to 8,775 marks, ending at 7,350 marks. This caused an increase in the cost of living, necessitating higher wages, so that whereas the average male worker over 20 years of age made 11.61 marks an hour in January, 1922, he was getting 420 marks an hour by the end of the year. The profits for the year were 321,620,660 marks, of which 220,000,000 marks were distributed, making a dividend of 200 per cent, which in gold marks, however, amounts to 0.04 per cent per share!

The report of the Continental Caoutchouc und Gutta Percha Compagnie, Hannover, is chiefly remarkable for the colossal amounts figuring in it. Thus, the credit account shows the total of 7,027,980,180.62 marks. This was caused by considerable purchases of raw materials secured at comparatively low prices during the year. The debit account was 8,118,298,790.34 marks. The gross profits were 445,615,458.68 marks. This firm, too, compares pre-war figures with those obtaining at present. During 1913 salaries and wages amounted to 13,004,176 marks against 2,014,139,141 marks in 1922; taxes were 1,095,779 marks against 473,982,531 marks; dividends 6,750,000 marks against 330,206,250 marks.

The percentage paid out in wages and salaries was 62.37 in 1913 and 71.5 in 1922; for taxes 5.25 in 1913 and 16.8 in 1922; while capital received 32.38 per cent in 1913 and 11.7 per cent in 1922.

### Rubber Goods for the Valley of the Kings

In the recent Egyptian discoveries various rubber goods were used to assist in the task of excavation. The *Gummi-Zeitung* has listed some of the articles. Rubber coats came in handy when the temperature cooled off and rubber soled shoes prevented damage by diminishing shock. Folding baths of rubber provided welcome facilities for taking a refreshing dip. Rubber gloves protected the wearer from infection. The electric lighting required insulated wires, cables and the like. As far as possible all tools were protected by rubber tubes to prevent any damage to the precious articles. Rubber matting was used to prevent slipping and causing harm to the objects.

### Rubber in the Garden

The above paper also mentions a number of rubber articles, besides hose, that are found useful both in the orchard and in the flower garden.

Rubber rings, threads, bandages, are used both in Holland and in Germany, especially for protecting the tender stems of rose bushes and similar plants. The rubber band or ring holds the plant in position against plank or pole. Rubberized insulating tape is used to cover stems the bark of which has suffered. It prevents drying out and as it is airtight, hastens healing. Espalier fruit is protected against night frost by coverings of gutta percha paper or rubberized fabric. Rubber bandages are also used in

grafting of fruit trees. It appears that even rubber solution has been used in grafting, with fair results.

### German Notes

One of the features at the Eighth Frankfurt Spring Fair was the large number of collapsible or folding boats exhibited. These boats are made of rubberized and rubber-impregnated fabrics of various qualities.

The well-known gutta-percha firm, H. Post & Co., Hamburg and Harburg a. E., celebrated its 75th anniversary on May 1. The firm specializes in gutta-percha tissue, gutta-percha prepared for cables, belting of gutta-percha and balata.

Reports from Danzig show that business there is slow. This is probably caused by the high prices of all kinds of rubber goods. Exports to Russia, Poland and neighboring states have appreciably diminished; demand from these places is quiet, chiefly because of lack of money. Business with the Scandinavian countries is improving but English and American competition makes matters difficult. Finally, a revulsion of feeling toward Germany is noticeable, especially in Sweden.

H. Rost & Co., Hamburg and Harburg a/E, Germany, celebrated on May 1 the seventy-fifth anniversary of the founding of their organization. The company is one of the leading manufacturers of gutta percha goods, its products including gutta percha tissue for technical and surgical purposes, prepared gutta percha for cable insulation and fuses, gutta percha belts, etc., as well as balata power and conveyor belts.

### Austrian Notes

Reports regarding the rubber industry of Vienna are by no means satisfactory, although more favorable than at the end of 1922. The exorbitant costs of raw material make the finished article too expensive to allow successful competition with foreign countries. In some cases, tires for instance, manufacturers have contented themselves with a price that yields practically no profit, just to hold their own against the so-called foreign invaders.

Lack of money, too, makes matters difficult in the home market. The export business, however, is still worse. The neighboring states have put such a number of obstacles in the way—import prohibition, high duties and freight rates—that it is impossible to do business except at prices which leave hardly any profits.

On April 25 tire casings were reduced 20 per cent and tubes 10 per cent by Michelin in Vienna.

### BRITISH GUIANA'S EXPORTS OF BALATA

Exports from British Guiana of balata chiefly to the United Kingdom, have exceeded 1,000,000 pounds annually, the substance representing the country's most important forest product. Balata is principally used for insulating purposes, the total value of the amount exported in 1920 being estimated at £164,376; in 1921, £203,624; and in 1922, £123,018.

### JAVA TO HOLD FOURTH ANNUAL FAIR

Under the patronage of the Netherlands Indian Government a fourth annual Fair will be held at Bandoeng, Java, continuing from July 28 to August 12, 1923. The occasion offers opportunities to American manufacturers of becoming familiar with East Indian conditions and markets. The New York City offices of the Netherlands Indian Government are located at 44 Beaver street.

LARGE EXTENSIONS ARE BEING MADE TO THE FACTORY MAINTAINED by Tan Kah Kee & Co., at 44 Sumbawa Road, Singapore, Straits Settlements, while the same organization has also begun manufacturing at Ipoh, in the Federated Malay States. Other undertakings include a new plant now in course of construction at Klang.

## The Rubber Trade in the Far East

By Our Regular Correspondent

### Malaya

Now is the time for all "die-hards" to say "I told you so," in view of the gloomy predictions of the coming collapse of restriction. Thoughtful people are trying to get at the bottom of the situation. To some, the drop in prices was not altogether unexpected. When the rise in prices continued steadily and made the over-optimistic indulge in visions of two shilling rubber, there were those who predicted set-backs. The rise, they said, was too sudden; stocks had not had time to be taken up, and while this was the case a healthy market was out of the question.

This is to a certain extent still the opinion of those to whom, however, a real cause for anxiety is the standard production of Malaya which has been fixed at 270,000 tons, a figure higher than Malaya's record output so far. On the 40 per cent restriction basis, production here will be 162,000 tons during 1923 and this added to the output from the Dutch colonies where the utmost is being done to take the greatest possible advantage of favorable prices, will cause the total production for 1923 to be greater than the consumption for that year.

When it is further considered that in spite of all that is being written and said against it a good deal of hoarding is taking place, that quantities of rubber are being smuggled out of the country, it becomes evident that there is a much bigger rubber supply than the Stevenson plan intended there should be.

It is quite evident that stricter measures are necessary to bring under control the various kinds of manoeuvres to evade restriction. At the same time, it is deplorable that producers should be so unwilling to co-operate with the government in order to make a success of the scheme which after much agitation on their part has finally been introduced for their own benefit.

The outsider is inclined to the opinion that it is no wonder all the voluntary restriction schemes failed so miserably, when so many attempts at trickery and evasion are noted under the present compulsory scheme.

It has more than once been suggested that the government should announce at an early opportunity its intention of keeping the scheme in force even after full standard production is authorized, for in this way hoarding would be checked. Extra vigilance is also necessary to prevent theft of rubber, which, it is believed, is more prevalent than ever, and stolen rubber offers an incentive to smuggling, which is now a paying business.

Despite all this, there is the tendency here to be hopeful. It is heard that American manipulations are at the bottom of the decline in prices and an American manufacturer's threats are going to influence the British government to the ruin of the planter. However, courage is being kept up by the idea that America must buy rubber to satisfy an active demand for rubber goods at home and must come to Malaya for much of it.

### America's Plans

In the first flush of triumph over the unexpected success of the restriction scheme, people here were inclined to view humorously what America had to say or threatened to do. Many did not bother about America at all. However, the attitude is changing somewhat. Certainly, the humor of the situation has slightly worn off and many weak souls have really begun to worry about America's plans. Not that anyone is even now taking the talk about rubber in the Philippines very seriously. It seems to be a foregone conclusion that rubber cannot be grown profitably there and in any case there are six or seven years to wait before new plantations will reach the producing stage.

What is making nervous people jumpy, are the rumors of a possible American-Dutch combine, and others vague and still more terrifying by their very vagueness.

It is now the duty of the *Straits Times*, champion of restriction, to cheer up the brave and prop up the feeble in spirit, which it proceeds to do in its usual thorough manner. Reasonable, as it generally is, it concedes that from the American point of view American tactics are sound; for, as all disciples of Coué believe, you have only to keep on suggesting a thing to make a person believe it in time, and if Americans continue to suggest the possibility of reprisals to get even, the planters will eventually become quite shaky, which would suit America to a T.

The present government in England does not carry away the approval of our contemporary. It is of the weak-kneed variety and even if it should have courage enough to stick to restriction, it would never think of answering America as she deserves to be answered. However, there is the comforting thought that no level-headed Englishman would meddle with the policy of restriction.

Still more soothing than this thought is the definite news from America that manufacturers do not all agree in disagreeing with the British government over the Stevenson plan and that they are not unanimous in their desire to invest \$450,000,000 in turning the Philippines into a competitor of Malaya. This is very wise of them, opines the *Straits Times*, for even supposing Americans succeeded in overcoming all difficulties and produced sufficient rubber in the Philippines, they would have to compete with about 600,000 to 700,000 tons of rubber from the rest of the world, produced at a lower cost. If they put a high duty on foreign rubber, huge quantities of starvation-price rubber would pour into Europe where the abundance and cheapness of the commodity would encourage all kinds of new uses and stimulate production of rubber goods to the ruin of American rubber manufacturers.

Of course, says this paper, more rubber will be grown in the Philippines, but not by big companies for the purpose of reprisal.

### Latex Shipments

During February, 1923, 12,380 gallons of latex, valued at \$19,433, were exported from Malaya. For the first two months of the year 1923, the total shipments were 30,847 gallons, valued at \$47,301.

### Local Rubber Manufactures

A local Chinese firm, Messrs. Tan Kah Kee & Co., of Singapore, have undertaken the manufacture of rubber goods. It is understood that their plant is capable of turning out over 10 tons of finished rubber goods per week. The articles include various kinds of footwear of rubber or rubber and canvas, heels and soles, rubber toys, playing balls, rickshaw tires both solid and pneumatic, brake blocks, door mats, horn bulbs, radiator and pump belts. A tire repairing department has also been added. Molded goods of all kinds are made to order. The machinery used in this plant was imported from England and the supervisors are European.

### Ceylon

At a general meeting of the Rubber Research Scheme (Ceylon), the work during the year 1922 was reviewed.

Experiments with the following preservatives are in progress: ammonia, caustic soda, washing soda, carbolic acid, formalin, a mixture of formalin and caustic soda, pyridine and potassium

cyanide. Although caustic soda is effective it is not likely to be satisfactory.

Experiments are also being made to determine whether sodium phenoxide (a mixture of caustic soda and carbolic acid) and the mixture of caustic soda and formalin are open to the same objections as caustic soda. Large samples have been sent to the Imperial Institute and to Dr. Kaye. The samples sent to the Institute will be converted into rubber and subjected to vulcanization tests to decide whether rubber deteriorates when kept in the form of latex and whether the iron drums used have had any harmful effect. Experiments were also conducted to determine the pressure produced when latex coagulates spontaneously. The figures are intended to show the possible consequences if latex is shipped with insufficient preservative.

In order to encourage bud-grafting the committee offered a prize of 100 rupees (about \$32) to the estate or individual producing the largest number of budded plants before December 31, 1922. Only four estates entered the competition, the prize going to the Mukalana group, which secured 4,600 successful buddings.

#### Uncured Inner Tube

An inner tube of raw rubber has been patented by Ray Gibson, of the General Rubber Co. It is made of ordinary sheet rubber specially reinforced to prevent creeping. The tube is protected from the weather and is practically in an airtight casing, which probably explains the fact that it shows no sign of tackiness though it has traveled more than 7,000 miles on a heavy car under all conditions. The tube is slightly heavier than a vulcanized tube.

#### Netherlands East Indies

Careful study of leading rubber papers here reveals the fact that there is an increasing feeling of the desirability of cooperation with the British restriction scheme. While some believe that the government should introduce restriction on a similar plan, the majority think this would be going too far and advocate instead voluntary restriction.

This would kill two birds at once, for at present planters are undeniably overtapping and a more conservative method would be good for the trees, while at the same time showing appreciation of the British planters' efforts by refraining from tapping to the limit and aiding instead of obstructing the restriction.

When prices first began to rise, the opinion was offered that they would have gone up even had restriction not been enforced. Now there is a growing tendency to ascribe this to the direct effect of the scheme.

Planters have been tapping feverishly and authorities fear that this may be overdone. Plantations should be in a position to profit in case of higher prices, while if another slump occurs there should be sufficient bark reserve to help them pull through again, otherwise the rested plantations in Malaya would be in an advantageous position.

A remarkable conversion to restriction is that of C. M. Hamaker who was formerly a vigorous opponent. The certainty that costs would increase, while the improvement of prices under restriction was problematic, seems to have been the chief reason for his attitude. Now, however, he feels that cooperation with the English means the sacrifice of a small profit as insurance against possible losses caused by overproduction, by a rubber combine of manufacturers, or by planters overtapping, with the result that the trees would be useless for a long time. Taking everything into consideration, therefore, he advises the planters to combine with the English producers as much as possible.

#### Declining Prices

As the Dutch have sacrificed nothing in order to gain higher prices, they can afford to take the matter of fluctuating prices quietly, without the nervousness manifested in Malaya. There is nevertheless quite a bit of comment on the trend of prices.

The *Nederlandsch-Indisch Rubber-en-Thee Tijdschrift* of

April 1, 1923, reviewing the situation, states that it is not improbable that the knowledge in advance that the standard production for 1923 for Malaya and Ceylon would be so much higher than might have been expected is largely responsible for the drop in prices. On the other hand it states that the possibility of a well-laid plan of action on the part of Americans should not be overlooked, especially as it is known that a very large part of the visible surplus stocks in London which have up to the present served as barometer of the statistical position, is in the hands of Americans.

A correspondent of the above paper is inclined to think that the American factor has been exaggerated. Behind each fluctuation in price some kind of American manipulation is seen. In his estimation the unsettled conditions in Germany and Turkey have a lot to do with the present market; while unloading by speculators who bought during November and December, 1922, and now either wish to reap their profits or have to sell in order to finance further purchases, has done the rest.

#### New Methods

At a rubber planters' meeting held at Weltevreden some interesting points were brought up for discussion. Concerning bud-grafting many conflicting statements have recently been made, resulting in less enthusiasm for this mode of propagating Hevea. Planters thought that success was incontestable. However, it appears that while bud-grafting gave satisfactory results, still better could be obtained with the right kind of seeds. The conclusion at the meeting was that the truth about the right choice between budding and seed selection had not yet been discovered and that everyone should consider the matter thoroughly before undertaking anything. Experiments are being carried out and it is expected that some interesting information regarding seed selection will soon be published.

Some tests were made with fresh latex and latex one year old kept liquid by means of ammonia. When acetic acid was added to the old latex, coagulation set in immediately, while the fresh latex remained liquid for some time after addition of the acid.

A very long paper by Dr. O. de Vries was also read. In this paper, "New Perspectives in Rubber Preparation," the newest methods of preparing rubber were reviewed; the shipment of latex, rubber content, methods of preserving, applications, were all discussed; sprayed rubber, slab and Kerbosch rubber were also mentioned. Kerbosch rubber is prepared from latex which is poured out in a thin layer.

Evaporation of the water is caused by heating. The thin, very elastic sheets obtained in this manner, without any mechanical treatment, seem to be in limited request for certain special purposes. Up to the present, however, Kerbosch rubber shows no superiority over ordinary sheet or crêpe. Packing in mats, Ceylon sole crêpe and blanket crêpe also came under review.

#### Hevea 40 Years Old

In the Economic Gardens at Buitenzorg there is a small plantation of Hevea planted in 1882. According to some notes by Dr. W. Vischer, published in the February issue of the *Archief voor de Rubbercultuur*, the trees are in a healthy condition and exhibit neither root-rot nor die-back.

The bark renewal in recent years has been very slow, though there is still sufficient bark for another round of tapping.

The production of these trees under a very light tapping system is estimated at 430 kilos per hectare (a kilo equals 2.2 pounds and a hectare about 2.45 acres). From this it appears evident that a well-cared-for estate can give higher yields than this and still remain productive for a long time. Under favorable conditions, the Hevea at 40 years is still vigorous.

For the older trees, systematic selection in connection with thinning out is an absolute necessity, and the fewer there remain the greater are the individual differences and value of the trees.

## Recent Patents Relating to Rubber

### The United States

Issued\* April 3, 1923

- N**O. 1,450,163 Truck tire flap. A. O. Abbott, Jr., assignor to Morgan & Wright—both of Detroit, Mich.  
 1,450,170 Puncture-proof tire. F. J. Clarke, Chicago, Ill.  
 1,450,288 Armored tire. W. L. Hamm, Oskaloosa, Ia.  
 1,450,303 Suspenders comprising a pair of elastic straps. W. M. Potter, Freedom, Pa.  
 1,450,320 Clamp for vulcanizing rubber tires. T. P. Little, assignor to The Fisk Rubber Co.—both of Chicopee Falls, Mass.  
 1,450,769 Tire deflation signal. R. A. Crosby, Holyoke, Colo.  
 1,450,800 Pneumatic tire. T. D. Frazier, Martins Ferry, Ohio.  
 1,450,818 Cushion tire. C. F. Ribak, San Francisco, Calif.

Issued\* April 10, 1923

- 1,450,953 Abdominal supporter. M. A. Fontaine, Manchester, N. H.  
 1,451,038 Pressure gage. R. Faries, Williamsport, Pa., assignor to A. Schrader's Son, Inc., New York City.  
 1,451,095 Apron of rubberized material. G. P. Greene, South Manchester, Conn.  
 1,451,121 Tire repair device. E. M. Simpson and J. H. Buckles, Night-hawk, Wash.  
 1,451,143 Demountable hard rubber cushioned tire and rim. J. H. Clark, Portage, Wis., assignor of  $\frac{1}{2}$  to J. M. Russell, Portland, Ore.  
 1,451,257 Pressure gage. W. P. Hammond, Passaic, N. J., assignor to A. Schrader's Son, Inc., Brooklyn, N. Y.  
 1,451,304 Inner tube. M. P. Mitchell, Eaton, Ohio.  
 1,451,307 Pressure gage. M. C. Schweinert, West Hoboken, N. J., and H. P. Kraft, Brooklyn, assignors to A. Schrader's Son, Inc., New York—both in New York.  
 1,451,314 Fountain pen ink sac. H. F. Austin, New Orleans, La.  
 1,451,327 A combined pneumatic and cushion tire. J. D. Cunningham, Houston, Tex.  
 1,451,349 Power transmission belt with a woven elastic surface. G. S. Towne, San Francisco, Calif.  
 1,451,359 Sash antirattler. J. E. Campbell, Rosedale, Kans.  
 1,451,372 Automatic valve for pneumatic hose fittings. F. J. Quin and W. H. Park, Belfast, Ireland.  
 1,451,437 Apparatus for bathing a person in bed. L. E. Bernier, Kelso, Wash.  
 1,451,494 Resilient heel. E. L. de Vere, Chicago, Ill.  
 1,451,514 Air pressure indicator and gage. E. C. Miller, Williamsport, Pa.  
 1,451,536 Tire tube. S. L. Davis and E. H. Rinehart, El Paso, Tex.  
 1,451,640 Pneumatic tire. E. H. Wickett, St. Paul, Minn.  
 1,451,645 Cord tire. C. L. Archer, Des Moines, Ia.

Issued\* April 17, 1923

- 1,451,712 Tire boot. L. T. and T. E. Peffer, Waukesha, Wis.  
 1,451,719 Dust cap for tire valves. T. J. Stephens, Spokane, Wash.  
 1,451,820 Tire tread. H. M. Fry, Johnstown, Pa.  
 1,451,822 Nursing bottle. R. J. Hagerty, assignor of  $\frac{1}{2}$  to F. H. Hehron and  $\frac{1}{2}$  to T. C. Kelly—all of Philadelphia, Pa.  
 1,451,975 Reinforcing tire fabric. T. Branson, assignor to Sibson & Stern, Inc.—both of Philadelphia, Pa.  
 1,452,089 Resilient tread for footwear. F. A. Nolan, St. Paul, Minn.  
 1,452,146 Tire valve cap. W. H. Conboy, Cheboygan, Mich.  
 1,452,168 Pneumatic tire. H. S. Rector, Chicago, Ill.  
 1,452,217 Tire. F. B. Pfeiffer, Akron, Ohio.  
 1,452,284 Tire inflating attachment for disk wheels. J. A. Steinmetz, Philadelphia, Pa.  
 1,452,291 Armored tire. J. L. Donat, Chicago, Ill.  
 1,452,292 Cushion tire. J. L. Donat, Chicago, Ill.  
 1,452,293 Resilient tire. J. L. Donat, Chicago, Ill.  
 1,452,324 Tire valve. L. P. Strutz, Corning, N. Y.  
 1,452,342 Resilient tired wheel. J. T. Jones, Maidenhead, England.  
 1,452,345 Tire structure for tractors. I. F. Kepler and A. A. Robb, Akron, Ohio, assignors to The B. F. Goodrich Co., New York City.  
 1,452,369 Rubber covered knee pad. C. L. Clarke, Fort Worth, Tex.  
 1,452,411 Life saving garment. O. F. Bunn, Bristol, Tenn.

Issued\* April 24, 1923

- 1,452,612 Mount for vehicle curtain window panes. J. M. McCloud, Brooklyn, N. Y.  
 1,452,653 Fountain pen. A. F. Poole, Kenilworth, and G. B. Vernier, Jr., Chicago—both in Ill., assignors to The Wahl Co., Wilmington, Del.  
 1,452,787 Armored tire. W. R. Busenbark, Akron, Ohio.

- 1,452,795 Combination wheel and pneumatic tire. H. de Hooydonck, Biarritz, France.  
 1,452,891 Rubber heel lift. C. H. Oakley, Trenton, N. J.  
 1,452,892 Resilient heel lift. L. M. Oakley, assignor to C. H. Oakley—both of Trenton, N. J.  
 1,452,894 Non-skid tread for auto tires. J. B. Pouk, assignor of  $\frac{1}{2}$  to B. D. Roberts—both of Streator, Ill.  
 1,452,976 Fountain bath brush. E. N. Lichtenstein, Baltimore, Md.  
 1,453,092 Cushion wheel. P. H. Dorsey, Algiers, La.  
 1,453,140 Tire protector. C. B. Jackson, Hartsells, Ala.  
 1,453,150 Double tube tire. J. H. McCormich, South Pittsburg, Tenn.  
 1,453,181 Steering wheel cover. W. F. Ridge, Akron, Ohio.  
 1,453,198 Cushion wheel. E. D. Snyder, Albany, Ill.  
 1,453,199 Resilient wheel and air tire to be used therewith. J. Spijker, Amsterdam, Netherlands.  
 1,453,217 Armored tire. D. M. Weigel, Chicago, Ill., assignor to The Wire Cord Co., Akron, Ohio.

### The Dominion of Canada

Granted March 20, 1923

- 229,695 Rubber tread for footwear. Wood-Milne, Limited, assignee of J. S. Clarke—both of Westminster, London, S. W. 1, England.  
 229,721 Combination air gage and valve stem. S. H. Smith, Eau Claire, Wis., U. S. A.

Granted March 27, 1923

- 229,753 Reinforcing for inner tubes. J. H. and G. A. Burrow, co-inventors—both of Spokane, Wash., U. S. A.  
 229,786 Rubber sole. L. Colella, Detroit, Mich., U. S. A.  
 229,858 Armored pneumatic tire. G. M. Stivers, Dixon, Calif., U. S. A.

Granted April 3, 1923

- 229,993 Life-saving apparel. R. J. Kee, Ottawa, Ont.  
 230,014 Rubber bath brush. S. C. Pearson, New York City, U. S. A.  
 230,023 Hot water bottle. R. W. Sampson, Malba, Long Island, New York, U. S. A.  
 230,024 Hot water bottle. R. W. Sampson, Malba, Long Island, New York, U. S. A.  
 230,027 Inner tube. J. Schwab, Winnipeg, Manitoba.

Granted April 10, 1923

- 230,100 Tire pressure gage. O. E. Richardson and H. E. Lundeen, co-inventors—both of Tacoma, Wash., U. S. A.  
 230,115 Puncture-proof pneumatic tire. R. Grieve and J. W. Flading, co-inventors—both of Lansing, Mich., U. S. A.  
 230,126 Tire tread. C. Bouthillette, Acton Vale, Quebec.  
 230,152 Pneumatic tire. E. H. Dickensheet, Kansas City, Mo., U. S. A.  
 230,243 Inner tube for tires. The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of D. C. Roberts, Indianapolis, Ind., U. S. A.  
 230,271 Means of identifying prepared roofing. The Ruberoid Co., Limited, Montreal, Quebec, assignee of The Ruberoid Co., assignee of A. R. Purdy—both of Boundbrook, N. J., U. S. A.

### The United Kingdom

Published March 28, 1923

- 192,367 Rubber protected stopper for heat insulated vessel. Aladdin Industries, Limited, 132 Southwark street, London; assignee of V. S. Johnson, 609 West Lake street, Chicago, Ill., U. S. A. (Not yet accepted.)  
 192,422 Rubber brushes and pads. Plantation Rubber Manufacturing Co., Limited and M. M. Dessau, 14 Mincing Lane, London.  
 192,444 Elastic necktie. J. P. Hogan, 34 Regent street and F. Hird, 3 Hartington Road—both in Leicester.  
 192,480 Metal and rubber foot mat and scraper. A. A. and F. F. Harvey and H. T. Clews (trading as H. Clews & Co.), Church Hill street, Smethwick, Staffordshire.  
 192,571 Skin, rubber or cloth glove. A. Blom, 33 Linnegatan, Stockholm, Sweden.  
 192,604 Armored tire. M. Beason, 81 Rue de Scissons and F. Nouzarede, 11 Rue de Tivoli—both in Bordeaux, France.

Published April 5, 1923

- 192,783 Golf balls. W. G. Morris, 74 Merton Road, Wimbledon, London.  
 192,808 Soap drainer. W. T. Cunningham, 266 Edgware Road, London.  
 192,822 Rubber-edged plate stands. H. Zoia, 2812 Cedar avenue, Cleveland, Ohio, U. S. A.

Published April 11, 1923

- 192,992 Armored tire. L. Brown and C. Macintosh & Co., Limited, Cambridge street, Manchester.

\*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

- 193,096 Surgical truss with pneumatic pad. T. Beasley, 36 Meadow Road, Merton, Surrey.  
 193,101 Inflatable cushion. H. Morley, Pinewood, Broad Road, Sale, near Manchester.  
 193,168 Skipping toys employing rubber. S. T. Dew, 96 King Richard's Road, and F. O. Trautmann, 28 Kirby Road—both in Leicester.  
 193,205 Wringing machine. W. J. Dil, 4 Boston Road, Mount Eden, Auckland, New Zealand.  
 193,206 Pneumatic tire. L. G. Williams, Corsyrhelig, Godrergrraig, Glamorgan.  
 193,238 Pneumatic tire. W. R. Beldam, 1A New London street, London.  
 193,264 Packing rings and rubber washers for stuffing boxes. H. Christiansen, 37 Brookhouse avenue, Leicester.  
 193,270 Tire pump connector. D. Hepburn and Boyce Motor Accessories, Limited, 139 Long Acre, London.

## Published April 18, 1923

- 193,333 Brassiere. A. M. Shepherd, Grasmere, Yew Tree Road, Edgbaston, Birmingham.  
 193,351 Pneumatic tire. M. N. A. Develay, 24 Rue de Dunkerque, Paris, France.  
 193,391 Rubber tooth or massage brush. R. M. Eithycombe, Wyoming, Macquarie street, Sydney, Australia. (Not yet accepted.)  
 193,478 Sponge rubber tube. E. C. Langton, 20 Offerton Road, Clapham, London.  
 193,491 Rubber fan belt. Dunlop Rubber Co., Limited, 1 Albany street, Regents' Park, London, and W. E. Hardeman, Fort Dunlop, Erdington, Birmingham.  
 193,577 Ink bottles with rubber pipette and washer. H. Rottenburg, 5 Adams Road, Cambridge.  
 193,583 Vulcanite roller for printing yarns. G. Anton and A. Hamilton, Victoria Carpet Co., Green street, Kidderminster.  
 193,600 Tire. F. B. Dehn, 53 Doughty street, London; Hercules Rubber Corporation, 922 Race street, Cincinnati, Ohio, U. S. A.  
 193,609 Rubber mat. G. H. Robinson, 29 Gracechurch street, London.  
 193,635 Rubber carton for packing bottles. J. Yates, Clifton street, Blackpool, and M. H. Herd, 8 Albert Square, Fleetwood.  
 193,672 Anti-rattling device for doors. F. Smith, 53 Eglantine Road, Wandsworth, London.  
 193,716 Device for filling and emptying receptacles. J. H. Delattre, 15 Rue Hegeippe Moreau, Paris, France.  
 193,723 Rubber holder for collapsible tubes. J. Delves, 18 Barker street, Ladywood, Birmingham.  
 193,730 Detachable tire for drags, tractors, etc. E. W. Seward, 83 Radcliffe Road, West Bridgford, Nottinghamshire.  
 193,757 Rubber bath brush. S. C. Pearson, 32 Park avenue, New York City, U. S. A.  
 193,781 Cow milkers. A. E. Parsons, Sidlesham, Chichester, Sussex.

## Published April 25, 1923

- 193,791 Air pressure alarm for tires. Michelin et Cie and E. E. Michelin, Place des Carmes Dechaux—both in Clermont Ferrand, France.  
 193,830 Tire valve. A. Schrader's Son, Inc., 470 Vanderbilt avenue, Brooklyn; assignees of M. C. Schweinert, 42 Riverside Drive, New York—both in New York, U. S. A. (Not yet accepted.)  
 193,849 Solid rubber tire. A. Ducasse, 70 Avenue de la Grande Armee, Paris, France. (Not yet accepted.)  
 193,856 Cushioned tire. J. Cosmo, de 86bis, Rue de Villiers, Levallois-Perret, Seine, France. (Not yet accepted.)  
 194,004 Vulcanizing clamps. H. C. L'Anson, 54 Bishop's Mansions, Bishop's Park Road, Fulham, London.  
 194,027 An artificial tooth for vulcanite dentures. R. A. Ellis, 59 Alexander Road, Acocks Green, Birmingham.  
 194,048 Pneumatic tire pressure gage. D. T. Bentley, 259 Los Banos avenue, San Mateo, Calif., U. S. A.  
 194,104 Marine life-saving garments. O. A. Youngren, 11 Broadway, New York City, N. Y., U. S. A.  
 194,125 Hot water bottle. R. W. Sampson, Malba, Long Island, New York, U. S. A.  
 194,150 Rubber soles, heels and pads. Wood-Milne, Limited, 2 Central Buildings, Westminster; H. B. Potter and C. B. Hampson, Ajax Rubber Works, Leyland, Lancashire.  
 194,188 Tire vulcanizer. Black Cat Motor Car Co., Limited, 25 Harley Mews, South Wigmore street, London; B. V. Seiller, 1 Stephansplatz 111, Vienna.  
 194,199 Dust caps for tire valves. G. B. Ellis, 70 Chancery Lane, London; A. Schrader's Son, Inc., 470 Vanderbilt avenue, Brooklyn, New York, U. S. A.  
 194,222 Waterproof garments. N. N. Whiteside, 45 East 17th street, New York City, N. Y., U. S. A.  
 194,226 Golf ball. T. W. Miller, 1 East 4th street, Ashland, Ohio, U. S. A.  
 194,232 Stocking suspender grips. H. Dahms, 41 Eisenacherstrasse, Berlin, Germany.  
 194,239 Hard rubber cigarette holder. O. Y. Imray, 30 Southampton Buildings, Holborn, London; F. O. Williams, Seamless Rubber Co., New Haven, Conn., U. S. A.

## New Zealand

## Published February 22, 1923

- 49,135 Wheel and solid rubber tire combined. O. Andrews, 67 Fitzherbert street, Palmerston North.

## Published March 8, 1923

- 49,051 Pneumatic cushion seat. H. Morley, Pinewood Broad Road, Sale, near Manchester, England.

## Published March 22, 1923

- 48,083 Tube for tires. T. B. McLeroth, Limited, Bank Chambers, Kingsway, London, W. C. 2, assignees of T. B. McLeroth, "Eastburn," The Crescent, Hadley Woods, London, England.

## Germany

## Design Patents Issued with Dates of Issue

- 839,357 (January 30, 1923). Solid rubber heel. Walther Loewendahl, Wallstrasse 15, Berlin.  
 939,739 (January 24, 1923). Finger-cot of rubber with woven metal insert. Karl Eberhagen, Calenbergerstrasse 18, Hannover.  
 839,860 (February 8, 1923). Atomizer. Dr. Clemens Bergl, Nymphenbergerstrasse 2, Berlin-Schöneberg, and Wilhelm Herbert Milch and Otto Student, both of Alexandrinenstrasse 95, Berlin.  
 840,273 (September 26, 1922). Exchangeable rubber heel. Karl Pfeifer, Fürbringerstrasse 22, Berlin.  
 840,274 (September 26, 1922). Exchangeable rubber heel patch. Karl Pfeifer, Fürbringerstrasse 22, Berlin.  
 840,275 (September 26, 1922). Exchangeable rubber heel patch. Karl Pfeifer, Fürbringerstrasse 22, Berlin.  
 840,391 (December 14, 1922). Pneumatic or solid tire with a raised design on the sides consisting of wreaths and spikes. Max Zimmermann, Metzgerstrasse 16, Leipzig-Gohlis.  
 840,392 (December 6, 1922). Tread for automobile tires. Hannoversche Gummiwerke "Excelsior" A.-G., Hannover-Limmer.  
 840,527 (February 6, 1923). Pneumatic rubber heel. Gustav Klinge, Wittekindstrasse 9, Hannover-Linden.  
 840,528 (February 6, 1923). Pneumatic rubber sole. Gustav Klinge, Wittekindstrasse 9, Hannover-Linden.  
 840,700 (November 30, 1922). Exchangeable rubber heel. Karl Umland, Brunsaußen bei Stade.  
 840,705 (January 16, 1923). Extra tip for rubber sole. Leopold Löffler, Langestrasse 42, Hannover.  
 840,724 (February, 1923). Stay lace of rubber. Continental-Caoutchouc und Gutta-Percha-Compagnie, Hannover.  
 840,812 (October 19, 1922). Rubber table for shoe soles and heel patches. Karl Bayer, Herrenkellergasse 1, Ulm a. D.  
 840,813 (October 26, 1923). Rubber table for shoe soles and heel patches. Karl Bayer, Herrenkellergasse 1, Ulm a. D.  
 840,814 (November 10, 1922). Exchangeable rubber heel. Hans Dorstewitz, Jakobstrasse 25, Brandenburg a. H.  
 840,995 (December 14, 1922). Strip of rubber with design, to be used as sole protector. Hans Bauer, Frundbergstrasse 27, Dresden.  
 840,996 (December 14, 1922). Strip of rubber with design, to be used as sole protector. Hans Bauer, Frundbergstrasse 27, Dresden.  
 841,081 (February 20, 1923). Syringe. Dr. Carl Quetsch, Bleichstrasse 7, Parnstadt.  
 841,091 (February 22, 1923). Rubber band holder, especially for cigar and cigarette cases. Joseph Winkler, Felsenstrasse 20, Pforzheim-Hilffelsenstein.  
 841,167 (March 17, 1922). Nipple with valve. Hatu Gummiwerke Hartmann & Tophorn G. m. b. H., Erfurt.  
 841,360 (January 10, 1923). Rubber sole with herringbone non-skid surface, reinforced tip, and side edge. H. Schwider Sächs. Gummi-und-Gutta-perchawarenfabrik, Dresden.  
 841,614 (February 14, 1923). Shoe sole composed of rubber and leather pieces. Heinrich Ahrens, Lorenzstrasse 28, and Enno Albrecht, Hornerweg 218, Hamburg.  
 841,897 (December 13, 1922). Rubber linen. Kölnische Gummifaden-Fabrik vormals Fred. Kohlstadt & Co., Köln-Deutz.  
 841,931 (March 5, 1923). Revolving rubber heel that can be slipped into position. Josef Bauer, Rannerstrasse 21 1/2, Augsburg.  
 842,268 (February 9, 1923). Syringe with eccentric opening and detachable cone. Horst & Feldten, Vaihingen-Stuttgart.  
 842,295 (March 6, 1923). Device for introducing medications or the like into hollows of the body. Hans Maas, Bahnhofstrasse 3, Hannover.  
 842,418 (March 10, 1923). Rubber shoe heel with reinforced toe. Zorne, G. m. b. H., Hamburg.  
 842,432 (January 2, 1923). Rubber sole. August Schreiber, Kronendorferstrasse 3, Halle a. S.  
 842,474 (March 10, 1923). Rubber bandage binder. Oskar Skalier A.-G., and Wilhelm Stenholz, Johannisstrasse 20-21, Berlin.  
 842,525 (March 5, 1923). Rubber plate for soling shoes. Gumbel, Barmen, Peter Vosskuhler, Barmen-Wichlinghausen.  
 842,526 (March 5, 1923). Rubber sole sheet with latchet. Rheinische Gummi-Gesellschaft W. Kletz & Co., Düsseldorf.  
 842,642 (March 7, 1923). Rubber stay lace fastening. Continental-Caoutchouc und Gutta-Percha-Compagnie, Hannover.  
 842,661 (March 17, 1923). Soles of rubber with toe bound by leather plate. Cunow & Grahele, Berlin-Tempelhof.  
 842,683 (February 15, 1923). Syringe piston of rubber or other elastic material wound with asbestos or impregnated thread. Dr. Ernst Richard Wilhelm Frank, Lützowufer 14, Berlin.  
 842,797 (March 5, 1923). Snail shaped inhaler for the nose. Carl Braun, Melsungen, H.-N.  
 842,835 (March 10, 1923). Rubber heel. Heinrich Tietzner, Meissen.  
 842,976 (August 16, 1922). Inflatable rubber toy. MacManfred v. d. Heyden, Leipzigerstrasse 119-120, Berlin.

- 842,984 (September 20, 1922). Rain protector for straw hats. Radium Gummiwerke G. m. b. H., Köln-Dellbrück.  
 843,319 (March 16, 1923). Window strap of rubber. Continental-Cautouchou und Gutta-Percha-Compagnie, Hannover.

#### Patents Issued with Dates of Issue

- 373,594 (November 6, 1921). Syringe. Anton Haag, Seilerstrasse 13, Frankfurt-am-Main.  
 373,930 (June 21, 1922). Syringe. Max Becker, Dresdner Strasse 71, and Christo Georgieff, Adalbertstrasse 60, both of Berlin.  
 374,167 (May 23, 1921). Pessary. Dr. Selmar Aschheim, Kurfürstendamm 61, Berlin.  
 374,531 (July 1, 1922). Valveless rubber tube for cell pneumatic tires. McLeroth Pneumatic Tyre Syndicate, Ltd., London; represented by F. Schwenterley, Berlin S. W. 11.  
 374,641 (April 29, 1921). Catheter. Ernst Kallmeyer, Tegernsee in Bayern.  
 374,866 (October 18, 1921). Syringe. Fa. B. Braun, Meisungen, Hessen-Nassau.  
 375,004 (February 26, 1921). Syringe. Dr. Apostol Waswasof, Küstrin-erstrasse 136, Berlin.  
 375,005 (November 19, 1921). Irrigator with rubber vessel and electric heating arrangement. Viktor Abel, Meierottostrasse 4, Berlin.  
 375,763 (July 30, 1921). Tire casing. Hans Wachter, Bismarckstrasse 4, Plauen i. V.  
 375,890 (July 7, 1921). Uterine pessary. Paul Angerstein, Warthe-strasse 6, Neukölln.

### Trade Marks

#### The United States

##### Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

##### Granted April 3, 1923, Act of February 20, 1905

- 166,481 NEVERFLAT—puncture-filling compound for automobile and other tires. Gonzalo Ruiz, New York, N. Y.  
 166,482 Within a circle, on a diamond-shaped black background the letters cWs, the W being larger than the other two letters; above this the word QUALITY, and below, the word COMFORT, these words following the curve of the circle—seamless elastic hosiery for sprains, varicose veins, weak knees, etc. Charles Walton & Son, Needham Heights, Mass.  
 166,490 KERR—rubber dam holders. Detroit Dental Manufacturing Co., Detroit, Mich.

##### Granted April 10, 1923, Act of February 20, 1905

- 166,552 JAX—rubber heels. Holtite Manufacturing Co., Baltimore, Md.  
 166,599 BOULEVARD BRAND CLOTHES; old English type, with line border—men's, youths' and boys' outer garments, including raincoats. Wozniak & Co., Chicago, Ill.  
 166,606 Against an oval background the figure of a runner, and at his back the word, MARATHON; between the double lines of the border the word MARATHON in the upper half and the words WANDERER FLEXVEX in the lower half—leather, fabric, or rubber belts supporting outer garments. The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.  
 166,610 TOM LOGAN SPORT SHOE, the words arranged one above another within a circle—leather boots and shoes with rubber and composition soles. Thomas H. Logan Co., Hudson, Massachusetts.  
 166,617 RADION—dials made of hard rubber for radio apparatus. American Hard Rubber Co., Hempstead and New York, N. Y.  
 166,670 HIKE-RITE—outdoor garments for men, women and children, including boots and shoes of leather, rubber, fabrics and combinations of same. Meier & Frank Co., Portland, Oregon.

##### Granted April 17, 1923, Act of February 20, 1905

- 166,788 SANIMO—rubber crib sheets, baby pants, sanitary napkins, belts, etc. The Sanimo Co., St. Louis, Mo.  
 166,805 THE LUCKY GARTER—garters. Anna F. Brandeau, Chicago, Illinois.  
 166,806 THE GOOD LUCK GARTER—garters. Anna F. Brandeau, Chicago, Illinois.  
 166,827 The words WING FOOT, separated by a winged foot—rubber or composition heels and soles for boots and shoes. The Good-year Tire & Rubber Co., Akron, Ohio.  
 166,828 VICTOR—nipples. Victor Loewenberg, doing business as Victor Specialty Co., New York, N. Y.  
 166,855 RADION—battery jars and other electrical appliances made of hard rubber. American Hard Rubber Co., Hempstead and New York, N. Y.  
 166,874 The words BIG BEAR, separated by the representation of a bear—fountain pens. Joseph J. Heller, Los Angeles, Calif.

##### Act of March 19, 1920, Section 1 (b)

- 166,986 DENMAN—rubber tires. The Denman-Myers Cord Tire Co., Warren, Ohio.

##### Granted April 24, 1923, Act of February 20, 1905

- 167,036 WONDER—golf balls. John Wanamaker, New York, N. Y.  
 167,037 TRICO; the letters arranged in the form of an isosceles triangle, the I at center, extending from apex to base—windshield cleaners of the squeegee or mechanical types. Trico Products Corporation, Buffalo, New York.  
 167,039 Silhouette of a flying goose, with the words GRAY and GOOSE, respectively, above and below it, curved to describe a circle—golf balls. Edward E. Marshall, trading as Huntingdon Manufacturing Co., Philadelphia, Pennsylvania.  
 167,042 SAN-IT, double-ruled letters on black background, the top stroke of the S extended to become integral with the I—Sanitary belts and shields. Hyman Usdin, trading as San-It Rubber Co., New York, N. Y.  
 167,065 A club, the emblem used on playing cards; this at the center of a circle described by the words: MACGREGOR MASTER—golf clubs and balls. The Crawford, McGregor & Canby Co., Dayton, Ohio.  
 167,109 AMERICAN BEAUTY—play balls and beach balls, an inflatable ball shaped something like a football or balloon and light enough to be used by children and especially on the sand at beaches. Knoxall Novelties, Inc., New York, N. Y.  
 167,142 HALL—inner tubes for pneumatic tires, cord tires, and fabric tires. The Columbia Tire & Rubber Co., Mansfield, Ohio.  
 167,168 The words MACGREGOR PILOT arranged to describe a circle—golf balls. The Crawford, McGregor & Canby Co., Dayton, Ohio.  
 167,171 "OCOBO"—golf balls. Lloyd A. Wimpfheimer, New York, N. Y.

### The Dominion of Canada

#### Registered

- 32,972 Words, "PARTRIDGE PRESSURE CURE," on a medallion—rubber footwear. The F. E. Partridge Rubber Co., Limited, Ontario.  
 32,994 The word CAMEO, associated with the representation of a cameo—braided and woven elastics and particularly elastic braids and webbings. Walker Webbing Co., Providence, R. I., U. S. A.  
 33,043 GOODYEAR WELT—boots and shoes. United Shoe Machinery Co. of Canada, Limited, Montreal, Quebec.  
 33,962 Black conventionalized diamond shaped figure on a white ground within a circle, and the words: BLACK DIAMOND—rubber surfaced clothing and rubber footwear. The Miner Rubber Co., Limited, Montreal, Quebec.  
 33,966 BLUE DIAMOND, and the representation of a blue diamond having a white border, the confines of the blue diamond being formed by lines in twisted spiral arrangement, the white border bearing the words: BLUE DIAMOND, MADE IN CANADA, and the blue diamond bearing the letters AHM and the word SYSTEM beneath, the letters and the word being contained within a circle—rubber footwear, tires, inner tubes, casings, patches and accessories. Ames Hilden McCready, Limited, Montreal, Quebec.

### The United Kingdom

#### Published April 4, 1923

- 430,235 THE PLUMAGE BLIZZARDEEN—men's waterproof coats. Gerrish, Ames, & Simpkins, Limited, London, E. C. 4.

#### Published April 11, 1923

- 431,548 CAPTAIN—footballs. Barrow, Hepburn & Gale, Limited, London, S. E. 1.  
 432,828 DEFENDER—all goods included in Class 40 but not including machine belting or similar goods. The Federal Rubber Co., of Illinois, Cudahy, Wisconsin, U. S. A.  
 432,984 SECURITY BRAND, the words placed one above the other, and at either side the representation of two axes crossed—canvas fire hose. Associated Belting Companies, Limited, London, S. E. 1.

#### Published April 18, 1923

- 421,532 VRIJ—rubber tires. Naamlooze Vennootschap Vereenigde Nederlandsche Rubberfabrieken, 162A Dunolaan, Doorwerth, Heveadorp, Holland. For service in the United Kingdom address in care of Dicker & Pollak, 20-23 Holborn, London, E. C. 1.  
 431,547 GOLGETTA—footballs. Barrow, Hepburn & Gale, Limited, London, S. E. 1.  
 433,530 AEROLASTIC—rubber tires or tires in which rubber predominates. The Dunlop Rubber Co., Limited, Fort Dunlop, Holly Lane, Erdington, Birmingham, Warwickshire.  
 434,112 ADAM CHAP, the words being separated by the representation of two men pulling against each other in an effort to stretch or pull apart a strip of some material—solid india rubber tirings made in England for export to India. Haroon Hamid, trading as H. Hamid & Co., Napier Road, Karachi, India. For service in the United Kingdom address in care of King's Patent agency, Limited, 146A Queen Victoria Street, London, E. C. 4.

#### Published April 25, 1923

- 422,221 C. M. A.—electric wire insulated with rubber. The Cable Makers Association, Sardinia House, Sardinia street, London, W. C. 2.  
 430,395 PARAFLO—floor coverings in the nature of floor cloth, made wholly or partly of rubber. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

- 432,919 **PED-O-GRIP**—fittings made of rubber or with rubber predominating, for insertion in boots and shoes, to grip the heel of the wearer. William Samuel Shaw & Lawrence William Hucklesly, 15 Park View, The Barony, Hantwich, Cheshire.
- 433,707 **OCHARO**—a utensil in the nature of a mop with a cleaning surface of porous india rubber. Charles James Harvey, 106 Mill Street, Kidderminster.
- 434,095 **RESISTON**—electric insulating materials of hard rubber and vulcanite articles, exclusively in Class 40. American Hard Rubber Co., New York, N. Y., U. S. A.
- 435,049 Representation of a horned animal charging; underneath this the words: **EL TOMO**—rubber insulated electric cables. Callenders Cable & Construction Co., Limited, London, E. C. 4.
- 435,050 Representation of a horse prancing, a youth astride flourishing a whip; beneath this the words: **EL GAUCHO**—rubber insulated electric cables. Callenders Cable & Construction Co., Limited, London, E. C. 4.
- 435,095 **WASP**—machine belting made of rubber, gutta percha or balata. Flexide, Limited, London, E. C. 4.

### New Zealand

Published February 22, 1923

- 19,065 Conventionalized diamond-shaped figure, dark with white border, and on the border the words: **BLUE DIAMOND**—footwear of every kind, including rubber. Skelton, Frostwick & Co., Limited, Christchurch.

Published March 22, 1923

- 19,508 **MAXFLI**—golf balls. The Dunlop Rubber Co., Limited, 1 Albany Street, Regent's Park, London, N. W. 1, England.
- 19,789 **PREMIER**—all products made of rubber, in Class 40, and in particular rubber tires, tubes and rubber accessories therefor. The Fisk Rubber Co., Chicopee Falls, Massachusetts, U. S. A.

### Designs

#### The United States

Issued\* April 3, 1923

- 62,164 Tire. Term 3½ years. Frederick S. Dickinson, New York, N. Y.
- 62,167 Tire Tread. Term 14 years. James N. Gunn, New York, N. Y., assignor to Morgan & Wright, a corporation of Michigan.
- 62,168 Tire Tread. Term 14 years. James N. Gunn, New York, N. Y., assignor to Morgan & Wright, a corporation of Michigan.
- 62,169 Tire Tread. Term 14 years. Earl A. Hecht, Mansfield, Ohio.



62,164 62,167 62,168 62,169 62,171 62,172 62,174

- 62,171 Tire Tread. Term 7 years. Darrell E. Patton, assignor to National Airless Tire Co., both of Los Angeles, California.
- 62,172 Tire Tread. Term 14 years. Wallace Henry Paull, Birmingham, assignor to The Dunlop Rubber Co., Limited, London, both of England.
- 62,174 Tire Casing. Term 3½ years. Harlan S. Rector, assignor to The Beckley-Ralston Co., both of Chicago, Illinois.

\*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

### The Dominion of Canada

Registered

- 5,724 Tire Tread. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario.
- 5,725 Tire Tread. Dunlop Tire & Rubber Goods Co., Limited, Toronto, Ontario.

### "TRUTH IN ADVERTISING" A PROTECTION TO TIRE INDUSTRY

The Associated Advertising Clubs of the World, 110 West 40th street, New York, N. Y., have recently issued a circular entitled "How the Associated Advertising Clubs Protect the Good Will of the Tire Industry." In this bulletin attention is called to the need of better methods in tire advertising and to the necessity for the reputable manufacturer to understand and combat the practices of fraudulent or irresponsible tire dealers. The association stresses the work of its National Vigilance Committee which, by means of its forty branches operating in the principal cities of the country, protects the legitimate tire manufacturer from deception or fraud. This committee handles many cases involving dishonest tire advertising and selling.

## Official India Rubber Statistics for the United States

### Imports of Crude and Manufactured Rubber

	December, 1921		December, 1922	
	Pounds	Value	Pounds	Value
<b>UNMANUFACTURED—free</b>				
Crude rubber				
From France	484,906	\$52,705	145,000	\$24,316
Netherlands	2,599,485	551,453	2,224,064	460,774
United Kingdom	6,278,293	1,009,332	1,990,103	424,829
Canada	325	83	113,100	29,439
Brazil	1,612,303	234,951	5,065,470	656,618
Peru			23,959	6,293
Other South America	51,200	21,850	504,104	51,666
British East Indies	32,260,048	4,158,511	55,733,678	8,322,847
Dutch East Indies	12,954,949	2,125,579	8,242,415	1,247,638
Other countries	2,403,292	211,880	1,122,731	186,539
Totals	58,644,821	\$8,370,344	75,164,624	\$11,410,959
Balata	258,083	153,162	100,980	56,730
Jelutong (Pontianak)	1,487,452	129,731	1,126,589	90,982
Gutta percha	383,620	49,629	124,725	18,087
Rubber scrap	696,501	40,074	1,899,156	37,104
Totals, unmanufactured	60,470,477	\$8,742,940	78,416,074	\$11,613,862
Chicle	436,644	\$182,918		
<b>MANUFACTURED—dutiable</b>				
Rubber belting			11,058	\$15,217
Other manufactures of and substitutes for rubber		\$145,826		48,256

### Exports of Domestic Merchandise

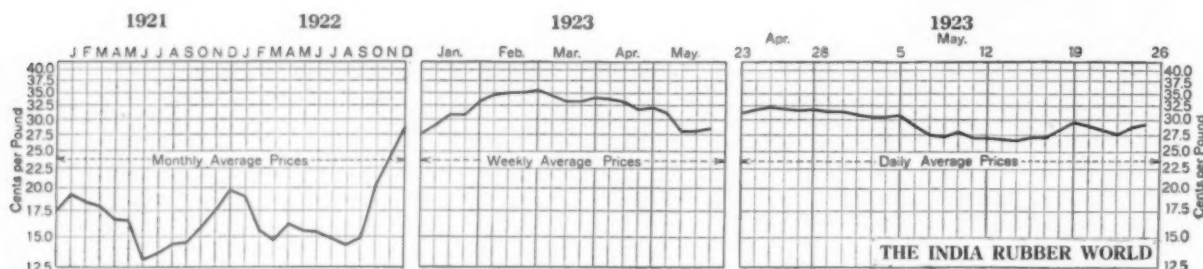
<b>MANUFACTURED</b>				
India rubber				
Reclaimed	82,664	\$10,131	240,989	\$19,632
Scrap and old	952,511	53,789	1,013,464	33,074
Footwear				
Boots <sup>1</sup>	8,660	22,430	15,879	38,946
Shoes <sup>1</sup>	176,544	152,522	29,456	25,241
Canvas shoes with rubber soles <sup>1</sup>			273,756	207,255
Druggists' rubber sundries <sup>1</sup>		65,161	68,276	66,153
Hard rubber goods				
Battery jars and accessories <sup>1</sup>			82,183	23,761
Other electrical supplies <sup>1</sup>			15,158	8,975
Other hard rubber goods <sup>1</sup>			40,529	32,444
Tires				
Pneumatic casings				
For automobiles <sup>1</sup>		1,193,160	110,771	1,191,791
Others <sup>1</sup>			6,001	34,549
Pneumatic tubes				
For automobiles <sup>1</sup>		98,553	79,502	125,702
Others <sup>1</sup>			4,116	4,367
Solid tires				
For automobile and motor trucks <sup>1</sup>		99,912	5,862	151,050
Others <sup>1</sup>			43,988	12,303
All other tires <sup>1</sup>		7,549		
Tire repair materials <sup>1</sup>			74,369	27,300
Belting <sup>1</sup>		71,328	297,552	144,793
Hoses <sup>1</sup>		29,905	292,880	111,058
Packing <sup>1</sup>		43,854	103,099	52,183
Soles and heels <sup>1</sup>		26,350	200,260	79,096
Thread <sup>1</sup>			137,352	132,977
Other rubber manufactures <sup>1</sup>		402,122	310,460	181,757
Totals, manufactured		\$2,335,856		\$2,704,407

### Exports of Foreign Merchandise

	December, 1921		December, 1922	
	Pounds	Value	Pounds	Value
<b>UNMANUFACTURED</b>				
India rubber	1,301,112	\$268,566	1,417,353	\$327,356
Balata	69,162	40,714	166,683	115,620
Jelutong (Pontianak)			546	180
Totals, unmanufactured	1,370,274	\$309,280	1,584,582	\$443,156
<b>MANUFACTURED</b>				
Gutta percha and india rubber		\$1,855		\$499
India rubber substitutes				
Totals, manufactured		\$1,855		\$499

<sup>1</sup>Details of exports of domestic merchandise by countries during December, 1922, appeared on pages 400 to 403 of our March, 1923, issue.

DURING 1922 THE PHILIPPINE ISLANDS PURCHASED 590,207 PAIRS of our canvas shoes with rubber soles, valued at \$462,501; Cuba took 616,361 pairs, valued at \$408,572; Argentina's share represented 463,432 pairs, valued at \$369,526; Mexico took 299,143 pairs, valued at \$272,423; while England is represented as taking 311,725 pairs valued at \$236,063.



Ratio Graph of New York Market Fluctuations—Average Prices of Spot Ribbed Smoked Sheets

## Review of the Crude Rubber Market

ONE month ago, New York spot prices for ribbed smoked sheets were 31½ to 32 cents. On May 25 the market was firm at 29 cents. The market trend during the past month has been downward, slowly at first, with a sudden drop the second week of May to 27 cents, the lowest level so far this year, which held for nearly ten days and was succeeded by a spasmodic rise falling again below the level from which the drop was made.

Late in April the market ruled weak and dull with some close trading by dealers. The market sold off on the London cables but later picked up with crêpe at a premium over ribs. There was no factory business and sales were confined to small lots. Factories were buying only for current requirements as the prices declined. Trading between dealers was on a very limited scale and there was no buying either in London or the Far East.

Continued weakness of the London market acted to depress New York. The decline in price which had so far been very gradual became accelerated and prices fell 1½ cent a pound. The dull and weak market was due to continued liquidation, low London offerings and lack of factory demand for supplies in volume. October-December position was the only one in which there was any interest at steady price level.

The tone of the market improved following the middle of May and although but little business was done the market rallied to 27¼ cents and reached 29 cents on the 19th, from which point it declined nearly 1½ cent but, recovering slowly, was firm at 29 cents on May 25.

All other grades showed corresponding sympathetic movement with ribs, upriver fine touching 28 cents May 25th.

Imports of all grades during April, 1923, were 31,588 tons, compared with 14,444 tons one year ago. Plantation arrivals for April, 1923, were 29,922 tons, compared with 13,910 tons one year ago. Total importations of all grades for four months ended April 30, were 120,921 tons, compared with 93,986 tons for the corresponding period of last year.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

**PLANTATIONS.** May 1, Spot first latex crêpe, 31½-31¾ cents; June-July, 31¼-31¾ cents; July-Sept., 31¼-31½ cents; July-Dec., 31½-31¾ cents; Oct.-Dec. 31½-32 cents. May 25. Spot first latex crêpe, 29 cents; June-July, 29¼ cents; July-Sept., 29½ cents; July-Dec., 29¾ cents; Oct.-Dec., 30 cents.

May 1. Spot ribbed smoked sheets, 31½-31¾ cents; June-July, 31¼-31¾ cents; July-Sept., 31½-31½ cents; July-Dec., 31½-31¾ cents; Oct.-Dec., 31¾-32 cents. May 25. Spot ribbed smoked sheets, 29 cents; June-July, 29¼ cents; July-Sept., 29½ cents; July-Dec., 29¾ cents; Oct.-Dec., 30 cents.

May 1. Spot No. 1 amber crêpe, 29¾-29¾ cents; June-July, 30¼-30½ cents; July-Sept., 30¾-31 cents; July-Dec., 31½-31¾ cents. May 25. Spot No. 1 amber crêpe, 28½ cents; June-July, 28½ cents; July-Sept., 28¾ cents.

May 1. Spot No. 1 rolled brown crêpe 27¼-27¾ cents; June-July, 27½-27¾ cents; July-Sept., 27¾-28 cents; July-Dec., 28-28½ cents. May 25. Spot No. 1 rolled brown crêpe, 26½ cents; June-July 26½ cents; July-Sept. 26¾ cents.

**SOUTH AMERICAN PARAS AND CAUCHO,** May 1. Spot, upriver fine, 27½-27¾ cents; islands fine, 27¼-27¾ cents; upriver coarse, 25½-25¾ cents; islands coarse, 14¼-14¾ cents; Cametá, 14½-14¾ cents; caucho ball, 27¼-27½ cents. May 25. Spot, upriver fine, 28 cents; islands fine, 26 cents; upriver coarse, 25 cents; islands coarse, 14¾ cents; Cametá 15 cents; caucho ball, 25¾-26½ cents.

### London

During the last week of April and the first week of May, the London market quotations on ribbed smoked sheets held close to 15 pence, never in that interval rising above 15½ pence. The general tone of the market was weak with very little demand on the part of consumers. The failure of an old and prominent crude rubber importing house early in May was temporarily a depressing factor.

A decline of prices in London paralleling that in New York set in May 8 and continued quite as long before recovery, which began May 18 as the market turned firm gradually rising from the low to 13½ pence to 14½ pence, May 25, reflecting at the latter date the strength of the New York market. London stocks a week ago were reported 55,617 tons or 30,000 tons under the peak of the year.

### New York Quotations

Following are the New York spot quotations per pound, for one year, one month ago, and May 25, the current date:

#### Plantation Hevea

	April 26, 1922	April 25, 1923	May 25 1923
<b>LATEX</b>			
Rubber latex (Hevea)	@	gal. \$1.25@1.35	gal. \$1.25@1.35
<b>CREPE</b>			
First latex .....	\$0.16¼@.16½	.32¼@.32¾	.29 @
Off latex .....	.16 @	.32 @.32¾	.28¾@
Amber No. 1 .....	.16 @	.31½@.31¾	.28¾@
Amber No. 2 .....	.15½@	.31¼@.31½	.28 @
Amber No. 3 .....	.15 @	.31 @.31¼	.27¾@
Brown, clean, thin...	.15 @	.31¼@.31½	.27½@.27¾
Brown, specky .....	.14½@	.30½@	.27¼@
Brown, rolled .....	.13 @	.29 @	.26½@

## Crude Rubber Market—Continued

	April 30, 1922	April 25, 1923	May 25, 1923
<b>SHEET</b>			
Smoked, ribbed .....	.16½ @ .16½	.31¼ @ .32	.29 @
Smoked, plain .....	.15½ @	.31¼ @	.27½ @
Unsmoked .....	.15 @	.30¼ @	.27 @
<b>SCRAP</b>			
Colombo scrap No. 1 .....	.13½ @	@	@
Colombo scrap No. 2 .....	.11½ @	@	@
<b>East Indian</b>			
<b>PONTIANAK</b>			
Banjermassin .....	.08 @	.08 @	.08 @
Palembang .....	.09 @	.08 @	.08½ @ .08¾
Pressed block .....	.13½ @	.13½ @	.13½ @ .13¾
Sarawak .....	.06½ @	.09½ @	.07 @ .07½
<b>South American</b>			
<b>PARAS</b>			
Upriver fine .....	.19 @	.28½ @ .28¾	.28 @
Upriver fine .....	*.32 @	*.40 @	*.38¼ @
Upriver, medium .....	.17 @	.26¼ @ .27	.25½ @
Upriver, coarse .....	.14 @	.25½ @ .26	.25 @
Upriver, coarse .....	@	*.37 @	*.36 @
Upriver, weak, fine .....	.16 @	.27 @	.25½ @
Islands fine .....	.17½ @ .18	.27½ @	.26 @
Islands medium .....	@	.26½ @	.24½ @
Islands coarse .....	.09½ @ .10	.14¾ @	.14¾ @
Cameta .....	.10 @	.15½ @	.15 @
Acre Bolivian fine .....	.19½ @	.28 @ .29	.27½ @
Acre Bolivian, fine .....	*.32 @	*.40½ @	*.39 @
Beni Bolivian .....	.19½ @ .20	.29 @	.27½ @
Madeira fine .....	.20 @ .21	.28½ @ .29	.27½ @
Peruvian fine .....	.17 @ .18	.27½ @	.26 @
Tapajos fine .....	.17 @	.27½ @	.26 @
<b>CAUCHO</b>			
Upper cacho ball .....	.14 @	.27½ @	.26½ @
Upper cacho ball .....	*.19 @	*.37½ @	*.37 @
Lower cacho ball .....	.12 @	.26½ @	.25¾ @
<b>Maniobas</b>			
Ceará negro heads .....	†.10 @	.23 @	.22 @
Ceará scrap .....	†.09 @	.09 @	.09 @
Manioba, 30% guaranty .....	†.07 @	.20 @	.23 @
Mangabeira, thin sheet .....	†.12 @	.26 @	.24 @
<b>Centrals</b>			
Central scrap .....	.08 @ .09	.23½ @ .24	.21¾ @ .22
Central wet sheet .....	.04 @ .05	.14 @ .16	.17 @ .19
Corinto scrap .....	.08 @ .09	.23½ @ .24½	.21¾ @ .22
Esmeralda sausage .....	.08 @ .09	.23½ @ .24½	.21¾ @ .22
Guayule wah'd & dried .....	.26 @	.28 @	.28 @
<b>Africans</b>			
Benguela, No. 1, 28½% .....	†.08½ @	.18 @	@
Benguela, No. 2, 32½% .....	†.07 @	.15 @	.14 @ .15
Congo prime, black upper .....	@	.28 @	.24 @ .25
Congo prime, red upper .....	†.14 @	.27 @	.21 @ .23
Kassai, black .....	†.13½ @	.28 @	.23 @ .24
red .....	†.12 @	.27 @	.20 @ .21
<b>Gutta Percha</b>			
Gutta Siak .....	.17½ @ .18	.19¼ @	.19 @ .19¼
Red Macassar .....	2.85 @ 3.50	3.00 @	2.90 @ 3.00
<b>Balata</b>			
Block, Ciudad Bolivar .....	.50 @ .51	.73 @	.72 @ .74
Colombia .....	.40 @ .42	.61 @	.58 @ .60
Panama .....	@	.60 @	.58 @ .60
Surinam, sheet .....	.64 @ .66	.83 @	.80 @ .83
amber .....	.70 @ .72	.88 @	.83 @ .85
<b>Chicle</b>			
Colombia .....	@	.25 @ .30	.25 @
Honduras .....	@	.62 @	.62 @
Venezuela .....	@	.63 @	.63 @
Yucatan fine .....	@	.65 @	.65 @

\*Washed and dried crepe. Shipment from Brazil.

†Nominal.

## Comparative Low and High New York Spot Rubber Prices

	1923*	1922	1921
<b>PLANTATIONS</b>			
First latex crepe .....	\$.026½ @ \$.032	\$.014½ @ \$.016½	\$.017½ @ \$.019½
Smoked sheet, ribbed .....	.26½ @ .32	.14½ @ .16½	.15½ @ .17½
<b>PARAS</b>			
Upriver, fine .....	.26 @ .28	.18 @ .18½	.16½ @ .18½
Upriver, coarse .....	.21½ @ .25½	.12½ @ .13½	.08¾ @ .09½
Islands, fine .....	.23½ @ .26	.17 @ .18½	.17½ @ .18
Islands, coarse .....	.14 @ .23	.08½ @	.09 @ .12
Cameta .....	.14 @ .15½	.09 @ .09½	.08½ @ .11

\*Figured to May 25, 1923.

## Amsterdam Rubber Market

JOOSTEN & JANSSEN, Amsterdam, report under date of May 4, 1923: Except for a shortlived recovery on the first of May prices continued to decline and rather sharply so at the end.

On the terminal market sellers came out more freely on the October to December position, but demand was fairly good at every fresh decline.

May delivery was specially wanted and consequently the contango decreased.

Spot lots met with ready buyers.

The close is quiet at the lowest prices as follows:

Hevea crepe and sheets Fl.	\$.82	Spot.
Hevea crepe and sheets Fl.	.83	May.
Hevea crepe and sheets Fl.	.84	July to September.
Hevea crepe and sheets Fl.	.86	October to December.

## Reclaimed Rubber

In sympathy with the crude rubber market, reclaims are offered at slightly lower quotations than a month ago. Considerable activity is noted in all grades of tire, tube and shoe stocks. Manufacturers are realizing that at prevailing low prices reclaims show lower volume cost than ever before. Reclaimers are emphasizing the distinct value of certain grades of tire reclaim which carry carbon black and other valuable ingredients in such amounts that these grades possess high tensiles and low gravities.

## New York Quotations

May 25, 1923

Prices subject to change without notice

## Reclaimed Stocks

	Per Pound
<b>FRICTION</b>	
Compounded .....	\$.18 @ \$.19
Pure gum friction .....	.22 @ .23½
<b>TUBE</b>	
Compounded .....	.12½ @ .13
Floating .....	.15½ @ .16
<b>AUTO TIRE</b>	
Black .....	.09½ @ .10
Gray .....	.11 @ .11½
White .....	.13½ @ .13¾
Black, washed .....	.11 @ .11½
<b>SHOE</b>	
Unwashed .....	.11 @ .11½
Washed .....	.13½ @ .14
<b>MECHANICAL</b>	
TRUCK TIRE .....	.10 @ .11
	.09 @ .09¾

## New York Average Spot Rubber Prices

PRICES IN CENTS PER POUND

	April, 1923															May, 1923											
	16	17	18	19	20	21	22	23	24	25	26	27	28	30	1	2	3	4	5	7	8	9	10	11	12		
PLANTATIONS:																											
Sheet																											
Ribbed, smoked.....	32½	32	32	32	31½	31½	31	31½	31½	31½	31½	31½	31½	31½	31½	30¾	30¾	30¾	30¾	30¾	28¾	27¾	27¾	27¾	27¾	27¾	
Crêpe																											
First latex.....	32½	32	32	32½	31½	31½	31½	31½	32½	32	31½	31½	31½	31½	31½	30¾	30¾	30¾	30¾	30¾	29	27¾	27¾	28½	27½	27½	
Off latex.....	32	31½	31½	31½	31½	31½	30¾	30¾	30¾	31½	31	30¾	30¾	30¾	30¾	29¾	29¾	29¾	29¾	29¾	28½	26¾	27½	27½	27	26¾	
No. 1 blanket.....	31½	31	31½	31½	31	31	30¾	30¾	30¾	31½	31	30¾	30¾	30¾	30¾	29¾	29¾	29¾	29¾	29¾	28½	26¾	26¾	26¾	26¾	26¾	
No. 2 blanket.....	30¾	30¾	30¾	30¾	30¾	30¾	29¾	29¾	29¾	30¾	30¾	30¾	30¾	30¾	30¾	29¾	29¾	29¾	29¾	29¾	28½	26¾	26¾	26¾	26¾	26¾	
No. 3 blanket.....	30¾	30¾	30¾	30¾	30¾	30¾	29¾	29¾	29¾	30¾	30¾	30¾	30¾	30¾	30¾	29¾	29¾	29¾	29¾	29¾	28½	26¾	26¾	26¾	26¾	26¾	
Thin, clean, brown.....	31½	30¾	30¾	30¾	30¾	30¾	29¾	29¾	29¾	30¾	30¾	29¾	29¾	29¾	29¾	28½	28½	28½	28½	28½	27½	25¾	25¾	25¾	25¾	25¾	
Specky brown.....	30¾	30¾	29¾	29¾	29¾	29¾	28½	28½	28½	28½	28½	28½	28½	28½	28½	27½	27½	27½	27½	27½	26¾	24¾	24¾	24¾	24¾	24¾	
Rolled brown.....	29	28½	28½	28½	28½	28½	27½	27½	27½	28½	28½	28½	28½	27½	27½	27½	26¾	26¾	26¾	26¾	24¾	24¾	24¾	24¾	24¾	24¾	

## The Market for Rubber Scrap

## New York

There is very little activity in the market for rubber scrap owing to the fact that the reclaimers are not seeking stocks. The recent drop in crude rubber prices has curtailed business in both reclaimed and scrap rubber trades. Most of the scrap business is confined to that arising from old orders; such new business as has recently been offered is small in volume and at reduced prices.

**BOOTS AND SHOES.** The tendency to lower prices noted a month ago continued through May. Dealers' bids have fallen off \$1.00 to \$2.00 a ton during the month.

**HOSE.** The market is dull and prices nominal. Demand has practically ceased for the time being.

**INNER TUBES.** Business is reported unsettled on all grades and prices declining over a month ago. No. 1 tubes down 1 cent; compounded gray, down 1½ cents.

**MECHANICALS.** These materials are without interest at nominal quotations because of their relatively low rubber content and quality.

## Quotations for Carload Lots Delivered

May 25, 1923

Prices subject to change without notice

## Boots and Shoes

Boots and shoes, black.....lb.	\$0.03 @ \$0.03 ¼
Trimmed arctics.....lb.	.02 @ .02 ½
Untrimmed arctics.....lb.	.01 ¾ @ .02

## Hard Rubber

Battery jars, black compound.....lb.	.02 @ .02 ½
No. 1 scrap.....lb.	.09 @ .10

## Inner Tubes

No. 1.....lb.	.04 ¾ @ .05 ¼
Compound red.....lb.	.03 ¾ @ .03 ¾

## Mechanicals

Black scrap, mixed.....lb.	.01 ¾ @ .02
Heels.....lb.	.00 ½ @ .00 ¾
Horse-shoe pads.....lb.	.02 ¾ @ .03 ¾
Hose, air brake.....lb.	.01 ¼ @ .01 ½
regular.....lb.	.00 ½ @ .00 ¾
Red, scrap, mixed.....lb.	.01 ¼ @ .02 ¾
White scrap, mixed.....lb.	.01 ¾ @ .02 ¾

## Tires

## PNEUMATIC

Auto peelings.....lb.	.01 ¼ @ .01 ¾
Bicycle.....lb.	.00 ¾ @ .01
Standard white auto.....lb.	.01 ¾ @ .01 ¾
Mixed auto.....lb.	.00 ¾ @ .01
Stripped, unguaranteed.....lb.	.00 ½ @ .01

## SOLID

Carriage.....lb.	.01 ¾ @ .02
Irony.....lb.	.00 ½ @ .00 ¾
Truck, clean.....lb.	.01 ¾ @ .02

LEADING MARKETS FOR OUR RUBBER GOODS  
DURING 1922

During the calendar year 1922 the best customers for our rubber manufactures ranked in the following order: England, with purchases valued at \$6,378,524; Quebec and Ontario, \$3,089,525; Mexico, \$2,680,642; Cuba, \$2,488,653; Argentina, \$2,030,443; Philippine Islands, \$1,668,871; Australia, \$1,377,706; British South Africa, \$1,344,898; France, \$1,324,117; Sweden, \$1,109,348; and New Zealand, \$1,002,200.

DURING FIVE SEPARATE MONTHS OF 1922 BRITISH SOUTH AFRICA led other countries of the world in her purchases of our mechanical rubber goods, the total value for the year being \$450,248. She was outstripped, however, by Mexico, where the figure reaches \$508,514.

## United Kingdom Rubber Statistics

## Imports

UNMANUFACTURED	March, 1922		March, 1923	
	Pounds	Value	Pounds	Value
Crude rubber				
From—				
Straits Settlements.....	1,962,700	£76,842	6,641,800	£428,736
Federated Malay States.....	5,710,100	268,136	3,702,900	234,810
British India.....	543,800	22,967	1,146,000	78,094
Ceylon and Dependencies.....	2,026,800	90,060	1,808,300	121,484
Other Dutch Possessions in Indian Seas.....	352,800	14,540	193,800	13,906
Dutch East Indies (except Other Dutch Possessions in Indian Seas).....	798,600	33,544	901,000	57,225
Other countries in East Indies and Pacific not elsewhere specified.....	218,100	9,349	159,000	10,690
Brazil.....	375,300	17,330	516,000	29,416
South and Central America (except Brazil and Peru).....	27,400	918	.....	.....
West Africa.....	.....	.....	.....	.....
French West Africa.....	.....	.....	271,300	13,846
Gold Coast.....	6,800	241	.....	.....
Other Parts of West Africa.....	35,400	1,472	69,700	2,307
East Africa, including Madagascar.....	.....	.....	97,000	5,573
Other countries.....	32,100	1,444	43,100	2,310
Totals.....	12,089,900	£536,843	15,549,900	£998,400
Waste and reclaimed rubber.....	46,300	655	85,000	1,108
Gutta percha and balata.....	349,500	44,490	899,200	117,513
Rubber substitutes.....	.....	.....	.....	.....
Totals unmanufactured.....	12,485,700	£581,988	16,534,100	£1,117,021

MANUFACTURED				
Boots and shoes....doz. pairs	16,563	£33,319	23,701	£36,388
Tires and tubes				
Pneumatic				
Outer covers.....	.....	370,507	.....	339,204
Inner tubes.....	.....	23,055	.....	32,833
Solid tires.....	.....	13,466	.....	19,420
Other rubber manufactures.....	.....	84,631	.....	95,372
Totals, manufactured.....	.....	£534,978	.....	£523,217

## Exports

UNMANUFACTURED				
Waste and reclaimed rubber.....	370,900	£7,810	586,400	£8,345
Rubber substitutes.....	71,200	4,664	61,400	1,467
Totals, unmanufactured.....	442,100	£12,474	647,800	£9,812
MANUFACTURED				
Boots and shoes....doz. pairs	11,107	£20,465	14,269	£22,876
Tires and tubes				
Pneumatic				
Outer covers.....	.....	170,845	.....	128,285
Inner tubes.....	.....	35,202	.....	27,146
Solid tires.....	.....	24,770	.....	18,577
Other rubber manufactures.....	.....	263,441	.....	239,884
Totals, manufactured.....	.....	£514,723	.....	£436,768

## Exports—Colonial and Foreign

UNMANUFACTURED	March, 1922		March, 1923	
	Pounds	Value	Pounds	Value
Crude rubber				
To Sweden, Norway and Denmark.....	156,000	£5,650	202,400	£13,567
Germany.....	2,324,100	87,292	1,052,400	69,481
Belgium.....	266,100	10,228	355,800	25,516
France.....	3,010,600	128,039	2,834,100	207,002
Spain.....	39,600	1,775	25,700	1,833
Italy.....	583,400	24,437	644,900	42,869
Hungary.....	.....	.....	45,100	3,421
Other European countries.....	406,100	12,867	144,600	9,920
United States.....	3,661,400	142,335	9,171,600	657,838
Canada.....	136,300	4,681	735,600	52,518
Other countries.....	57,700	2,728	39,200	1,968
Totals.....	10,641,300	£420,032	15,251,400	£1,085,933
Waste and reclaimed rubber.....	.....	.....	48,500	505
Gutta percha and balata.....	83,400	11,668	88,600	14,017
Rubber substitutes.....	.....	.....	2,000	20
Totals, unmanufactured.....	10,724,700	£431,100	15,390,500	£1,100,475
MANUFACTURED				
Boots and shoes....doz. pairs	477	£2,004	63	£240
Tires and tubes				
Pneumatic				
Outer covers.....	.....	36,098	.....	5,091
Inner tubes.....	.....	8,310	.....	512
Solid tires.....	.....	633	.....	765
Other rubber manufactures.....	.....	1,456	.....	3,298
Totals, manufactured.....	.....	£48,501	.....	£9,906

## The Market for Cotton and Other Fabrics

### New York

**AMERICAN COTTON.** Middling spot cotton was 29 cents on April 28, but the market influence was strongly downward, declining on May 12 to 25.3 cents. This low was succeeded by an equally rapid upward movement reaching 28.65 cents on May 23.

The rapid decline was attributed to heavy liquidation of old long accounts, the absence of competition for the old crop remnant at recent figures, indications that last winter's high prices have checked consumption abroad, distrust of commodity values generally, and belief in an increased crop for the coming season owing to increased acreage and the free use of fertilizers. The new crop is reported backward, due to unfavorable weather.

**EGYPTIAN COTTON.** During the past month the market in Egyptian grades has been dull and weak, showing a steady decline in sympathy with the weak domestic market.

The Egyptian Government's revised estimate of last season's crop raises the total produced from 4,002,000 kantars to 4,900,000 kantars. Measures will be enforced requiring ginning in future to be completed before May 1, so that stocks will not be held back in the interior after that date but will be continued in Alexandria. Present stocks in Alexandria are now at 171,097,000 pounds.

**SEA ISLAND.** This cotton continues neglected and the supply is small.

**ARIZONA COTTON.** This grade is not in large supply. The market quotations on both grades declined in sympathy with middlings.

### Cotton Fabrics

**RAINCOAT FABRICS.** As far as demand for merchandise is concerned business in raincoat fabrics is at a standstill. Buyers lack confidence in the market and regardless of price will not

place quantity orders. Prices have not been revised but probably will be within the next few weeks.

**SHEETINGS.** The market for sheetings is characterized as soft and weak, with the mills willing to trade at concession. Buying is light, principally in small lots and only spot goods. Present outlook is not gratifying.

**HOLLANDS.** The market is quiet and prices unchanged.

**TIRE FABRICS.** Early in May the market was quiet with standard fabrics in limited demand as seasoned curtailment of tire output began. About the middle of the month increasing inquiry was manifest and also indications that hand-to-mouth buying will characterize the market during the third quarter of the year, which is dull normally. Secondary buying will probably not materialize. Tire makers are requesting prompt shipment on their initial orders and have no apparent need for additional supplies.

In sympathy with raw cotton movements, tire fabric quotations have fallen 4 cents in the past six weeks. The mills would shade somewhat more and do not expect new business beyond July. Fabric production will not decline, however, till after June.

**DUCKS, DRILLS AND OSNABURGS.** Quotations on ducks have been declining most of the past month. Mills are accumulating stocks of yardage rather than close down because of the lack of new orders. During the last week of May a marked improvement took place in the demand for heavy goods. Stocks of enameling duck are practically depleted.

**SHEETINGS.** In common with other grades of cotton goods business is very quiet. Manufactured goods did not advance in sympathy with the recent upward movement of raw cotton. Consumers generally are apparently anticipating the usual summer seasonal decline of production in their various lines.

### New York Quotations

May 25, 1923

Prices subject to change without notice

#### Burlaps

40-7½-ounce	100 yds.	\$5.25	@ \$5.30
40-8-ounce		5.30	@ 5.35
40-10-ounce		6.85	@ 6.95
40-10½-ounce		6.90	@ 7.00

#### Drills

38-inch 2.00-yard	yard	.25½	@
40-inch 3.47-yard		.15	@
52-inch 1.90-yard		.28	@
60-inch 1.52-yard		.34½	@

#### Duck

##### CARRIAGE CLOTH

38-inch 2.00-yard	yard	.26½	@
40-inch 1.47-yard		.35½	@
72-inch 16.66 ounce		.57½	@
72-inch 17.21-ounce		.59½	@

##### MECHANICAL

Hose	pound	.45	@
Belting		.46	@

#### Tennis

51-inch 1.35-yard	yard	.42½	@
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#### Liners—Non-Sticking

Up to 5-oz. weight, up to 40-inch width	lin. yd.	.35	@
Up to 12-oz. weight, 40-62-inch width		.45	@

#### Osnaburgs

40-inch 2.35-yard	yard	.23	@
40-inch 2.48-yard		.21½	@
40-inch 3.00-yard		.18	@
37½-inch 2.42-yard		.22½	@

#### Hollands

##### DEAD FINISH

Standard, 37-inch, white and colors	yard	@	
42-inch, white and colors		@	

##### FLAT FINISH

Imperial, 36-inch, white and colors	@		
40-inch, white and colors	@		

\*Nominal.

#### Raincoat Fabrics

##### COTTON

Bombazine 64 x 60	yard	\$0.15	@
60 x 48		.13	@
Cashmeres, cotton and wool, 36-inch, tan		.55	@
Plaids 60 x 48		.14½	@
56 x 44		.13½	@
Surface prints 60 x 48		.15½	@
64 x 60		.16½	@

##### Sheetings, 40-inch

48x48, 2.50-yard	yard	.17½	@
48x48, 2.85-yard		.15	@ .15½
64 x 68, 3.15-yard		.16	@ .16½
56 x 60, 3.60-yard		.13½	@ .14
48 x 44, 3.75-yard		.11½	@ .12
44 x 44, 5.50-yard		.09½	@ .09½

##### Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.08½	@ .09
44 x 40, 6.00-yard		.07½	@
40 x 40, 6.00-yard		.07½	@ .07½

#### Silks

Canton, 38-inch	yard	.37½	@
Schappe, 35-inch		@	

#### Tire Fabrics

##### BUILDING

17½-ounce Sakellaridis, combed	pound	.85	@
17½-ounce Egyptian, combed		.73	@
17½-ounce Egyptian, carded		.66	@
17½-ounce Peeler, carded		.62	@

##### CORD

15-ounce Egyptian, combed	pound	.76	@
15-ounce Egyptian, carded		.69	@
2½-pick Peeler, carded		.65	@

##### BREAKER

Leno, Peeler, carded		.62	@
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##### CHAFER

9¼-ounce Egyptian, carded	pound	.74	@
9¼-ounce Peeler, carded		.70	@

## The Market for Chemicals and Compounding Ingredients

### New York

**C**ONTINUED activity of the rubber trade manufacturing divisions is stimulating products of the commoner ingredients and pigments to overtime operation to meet their needs. Prices generally continue unchanged from a month ago, except for a drop in benzol grades and the appearance of a new line of carbon black at a price much under that of the standard product.

**ANILINE.** Prices remained steady throughout the month and consumption in routine volume.

**ASBESTINE.** This is much used as a paint material as well as a compounding ingredient in mechanical rubber goods. It is now being produced and sold in larger volume than ever.

**BARYTES.** Production is well sold up and rubber makers are taking more than usual. Price remains unchanged.

**BENZOL.** Early in May the demand was routine. About the middle of the month trade became active and a week later the prices on both grades were reduced 2 cents a gallon.

**BLANC FIXE.** Producers of blanc fixe are operating their plants to capacity in the effort to keep up with sales.

**CARBON BLACK.** Producing capacity is overtaxed to meet consumers' needs. Large contracts are now running at 15 to 20 cents. Spot sales are being made at around 25 cents. A new carbon black is being offered in bags at 9½ cents a pound in large lots and at 13 to 16 cents a pound in less than carload lots.

**CHINA CLAY.** Domestic producers are very busy trying to meet consumers' needs. Imports are arriving in liberal volume. China clay has become very popular with rubber makers owing to its toughening and abrasive resistance effect.

**DRY COLORS.** Mills are working overtime to supply the demand for dry colors which is exceeding normal capacity.

**LITHARGE.** Price has held unchanged. The consumption of all lead pigments is running into larger tonnage than a year ago in both rubber and paint industries.

**LITHOPONE.** The popularity of lithopone far exceeds the ability of domestic producers to meet it. Consumption is breaking all records, the rubber trade need being unusually large. A considerable tonnage of imported lithopone is arriving.

**SUBLIMED LEAD.** The interest in sublimed lead is quite active, as with litharge and other lead products. The price is steady at 9¼ cents a pound.

**SULPHUR.** This staple of the rubber industry is in constant routine demand at equally constant prices.

**TALC.** Talc is quite as indispensable as sulphur in rubber goods manufacturing as well as in other lines, which accounts for the uniform good demand for both domestic and foreign grades.

**SOLVENT NAPHTHA.** For months past this material has been in short supply, while the volume of inquiries has been steadily large. This condition still holds and probably accounts for the fact that the reduction in price of benzol grades was not reflected by a change in solvent naphtha.

**WHITING.** The tonnage absorbed in rubber manufacture is maintained steadily at normal, at practically fixed prices.

**ZINC OXIDE.** A month ago one large producer set all leaded grades at the same price. Stocks are in ample supply and active movement into the rubber and other consuming trades.

### Accelerators, Inorganic

Lead, carbonate.....lb.	\$0.09¼ @
Lead, red.....lb.	.11¼ @
sublimed blue.....lb.	.09¼ @
sublimed white.....lb.	.09¼ @
Lime, flour, superfine.....lb.	.02 @
R. M. hydrated.....ton	20.00 @
Litharge, domestic.....lb.	.10½ @ .12
Magnesia, carbonate, light.....lb.	.08 @ .09
calcined, light (bbia.).....lb.	.23 @ .24
calcined, ex. light (bbia.).....lb.	.43 @
calcined, md. light (bbia.).....lb.	.05 @
calcined, heavy (bbia.).....lb.	.05 @
Orange mineral A.A.A.....lb.	.14¼ @

### Accelerators, Organic

A-7.....lb.	.75 @ .85
Accelerene (f. o. b. English port).....lb.	.13 @
Aldehyde ammonia crystals.....lb.	.90 @ .95
Aniline (f. o. b.) factory.....lb.	.16¼ @ .17¼
sulphate.....lb.	.33 @
Cryline.....lb.	.60 @
Diphenylguanidine.....lb.	1.20 @
Ethylidene aniline.....lb.	.70 @ .75
Excellerex.....lb.	.45 @ .50
Formaldehyde.....lb.	.15¼ @ .16
Formaldehyde aniline.....lb.	.52¼ @
H. R.....lb.	@
Hexamethylene tetramine.....lb.	.95 @ .97¼
Lead oleate (bbia.).....lb.	.18 @
Methylene aniline.....lb.	.40 @ .46
No. 999.....lb.	.17¼ @
Paraldehyde.....lb.	.17 @ .19
Para-nitros-dimethyl aniline.....lb.	1.10 @
Paraphenylene diamine.....lb.	1.55 @ 1.60
Quinodine.....lb.	.65 @
Super-sulphur, No. 1.....lb.	.50 @ .60
No. 2.....lb.	.25 @ .30
Super-X.....lb.	.35 @
Tetramethyl thiuramdisulphide.....lb.	6.00 @
Thiocarbamilide.....lb.	.26 @ .35
Triphenylguanidine.....lb.	.70 @
Vul-Ko-Cene.....lb.	.35 @

\*Nominal.

### New York Quotations

May 25, 1923

#### Acids

Acetic 28% (bbia.).....cwt.	\$3.38 @ \$3.63
glacial, 99%.....cwt.	12.78 @ 13.03
Cresylic (97% straw color)gal.	1.25 @ 1.30
(95 dark).....gal.	1.20 @ 1.25
Sulphuric, 66 degrees.....ton	15.00 @ 16.00

#### Alkalies

Caustic soda.....lb.	.03¼ @ .03½
flake, 76% (factory).....cwt.	3.50 @ 3.75
solid, 76% (factory).....cwt.	3.15 @ 3.40

#### Colors

<b>BLACK</b>	
Pene, powdered.....lb.	.05¼ @ .07¼
Carbon black.....lb.	.18 @ .22
pressed.....lb.	.19 @ .24
Drop.....lb.	.07¼ @ .10
Gritless black.....lb.	.40 @
Ivory black.....lb.	.15 @ .45
Lampblack.....lb.	.12 @ .40
Micromex.....lb.	.19 @ .24
Shawinigan.....lb.	.17 @ .18
<b>BLUE</b>	
Cebalt.....lb.	.21 @ .26
Gritless blue.....lb.	3.50 @
Prussian.....lb.	.55 @ .60
Ultramarine.....lb.	.15 @ .35

#### BROWN

Iron oxide.....lb.	.04¼ @ .05¼
Sienna, Italian.....lb.	.05¼ @ .06¼
Umber, Turkey.....lb.	.05¼ @ .06¼

#### GREEN

Chrome, light.....lb.	.32 @ .34
medium.....lb.	.35 @ .36
dark.....lb.	.36 @ .45
commercial.....lb.	.12 @
tile.....lb.	.13 @ .15
Gritless green.....lb.	3.50 @
Oxide of chromium.....lb.	.35 @ .67

#### RED

Antimony, crimson.....lb.	\$0.40 @
crimson, 15/17% free.....lb.	.36 @ .45
crimson, R.M.P. No. 3.....lb.	.50 @
crimson F.....lb.	.35 @
Antimony, golden.....lb.	.20 @
golden R.M.P. No. 7.....lb.	.21 @
golden, 15/17% free.....lb.	.20 @ .22
golden, No. 1.....lb.	.30 @
golden, No. 2.....lb.	.20 @
7-A.....lb.	.35 @
vermilion 15/17% F. S.....lb.	.50 @
vermilion 5% F. S.....lb.	.65 @
Arsenic sulphide, red.....lb.	.15¼ @
Gritless red (four shades).....lb.	3.50 @
purple.....lb.	2.50 @
Indian.....lb.	.08 @ .12
Indian maroon, English.....lb.	.08 @
Iron oxide, reduced.....lb.	.08 @ .12
pure bright.....lb.	.12 @ .14
Maroon oxide.....lb.	.08 @ .12
Red oxide, English.....lb.	.12 @
Spanish.....lb.	.04 @
Oximony.....lb.	.16 @
Para toner.....lb.	1.00 @ 1.10
Spanish natural.....lb.	.03¼ @ .04¼
Toluidine toner.....lb.	2.75 @ 3.00
Venetian.....lb.	.03¼ @ .06
Vermilion, American.....lb.	.25 @ .30
English quicksilver.....lb.	1.30 @ 1.35

#### WHITE

Albalith.....lb.	.07 @ .07¼
Aluminum bronze.....lb.	.55 @ .60
Lithopone, domestic.....lb.	.07 @ .07¼
Azo.....lb.	.07 @ .07¼
Red Seal, imported.....lb.	.07 @ .07¼
<b>Zinc oxide:</b>	
American Horse Head.....lb.	.08 @ .09
Special.....lb.	.08¼ @ .09
XX red.....lb.	.08 @ .08¼
French process, Florence	
Green seal.....lb.	.10¼ @ .11¼
Red Seal.....lb.	.09¼ @ .10¼
White seal.....lb.	.12 @ .12¼
Azo (factory).....lb.	
ZZZ (lead free).....lb.	.08 @ .08¼
ZZ (-5% leaded).....lb.	.07¼ @ .07¾
Z (8.15% leaded).....lb.	.07¼ @ .07¾

## Colors—Continued

## YELLOW

Chrome, light and med. . . . .lb.	\$0.20	@ \$0.21
Gritless yellow . . . . .lb.	3.50	@
India rubber . . . . .lb.	.87½	@
Ochre, domestic . . . . .lb.	.03½	@ .04½
imported . . . . .lb.	.03¾	@ .04½

## Compounding Ingredients

Aluminum flake (carloads) . . . . .ton	22.50	@
filler . . . . .ton	23.00	@
hydrate, light . . . . .lb.	.19	@ .21
Ammonia carbonate . . . . .lb.	.07½	@ .10½
Asbestos (carloads) . . . . .ton	25.00	@
Aluminum silicate . . . . .ton	22.50	@ 25.00
Barium, carbonate, precip. . . . .ton	68.00	@ 75.00
dust . . . . .lb.	.05	@
Barytes, pure white C. L. . . . .ton	30.00	@
Basofer . . . . .lb.	.04¾	@
Blanc fixe . . . . .lb.	.04¾	@ .04½
Carrara filler (factory) . . . . .lb.	.02	@
Chalk, precip. extra light . . . . .lb.	.04½	@ .05
heavy (f.o.b. factory) . . . . .lb.	.03¾	@ .04
China clay, Dixie . . . . .ton	22.00	@ 32.00
Blue ribbon (carloads) . . . . .ton	14.00	@
Blue Ridge . . . . .ton	20.00	@ 30.00
Super Dixie . . . . .lb.	.02½	@
Cotton flock, black . . . . .lb.	.12	@ .13
light-colored . . . . .lb.	.13	@ .15
white . . . . .lb.	.17	@ .22
Cotton linters clean mill-run . . . . .lb.	.06½	@
Fossil flour (powdered) . . . . .ton	60.00	@
(bolted) . . . . .ton	60.00	@
Glue, high grade . . . . .lb.	.30	@ .40
medium . . . . .lb.	.20	@ .26
low grade . . . . .lb.	.16	@ .19
Graphite, flake . . . . .lb.	.05	@
amorphous . . . . .lb.	.05	@
Infusorial earth (powd.) . . . . .ton	.02	@
(bolted) . . . . .ton	.02	@
Lime (bolted) . . . . .lb.	.02	@
Mica, amber . . . . .lb.	.05	@
white . . . . .lb.	.03	@ .05
Pumice stone, powdered . . . . .lb.	.06	@
Rotten st., powd. (bbis.) . . . . .lb.	.02½	@ .04½
Soap bark, cut . . . . .lb.	.08½	@ .10
Soapstone, powdered, gray . . . . .ton	15.00	@ 20.00
Sodium bicarbonate (bbis.) . . . . .lb.	.02¾	@
Starch, powd. corn (bags) . . . . .cwt.	3.07	@ 3.17
(bbis.) . . . . .cwt.	3.34	@ 3.44
Talc, soapstone . . . . .ton	22.00	@ 23.00
Terra blanche . . . . .ton	22.00	@ 23.00

\* Nominal.

## Chemical Market—Continued

## New York Quotations

May 25, 1923

Whiting, Alba. . . . .cwt.	@
chalk . . . . .ton	@
commercial . . . . .cwt.	\$1.05 @ \$1.25
English cliffstone . . . . .cwt.	1.75 @ 2.50
gilders (bolted) . . . . .cwt.	1.10 @
K. T. . . . .ton	@
Perfection (carloads) . . . . .ton	21.00 @ 22.00
Quaker . . . . .ton	13.00 @ 15.00
Superfine, L. H. B. . . . .ton	13.50 @ 22.50
W. T. . . . .ton	15.00 @
Word pulp, XXX . . . . .ton	12.00 @
X (f. o. b. factory) . . . . .ton	38.00 @
York . . . . .ton	25.00 @

## Mineral Rubber

Genasco (factory) . . . . .ton	50.00	@ 52.00
Hard hydrocarbon . . . . .ton	33.00	@ 42.00
Ohmlac Kapak, K-R . . . . .ton	130.00	@
K-4 . . . . .ton	175.00	@
Soft hydrocarbon . . . . .ton	30.00	@ 40.00
320/340 M. P. hydrocarbon . . . . .ton	45.00	@ 50.00
300/310 M. P. hydrocarbon . . . . .ton	40.00	@ 45.00
Pioneer, M. R., solid (fac.) . . . . .ton	42.00	@ 44.00
M. R. granular . . . . .ton	52.00	@ 54.00
Robertson, M. R., solid . . . . .ton	35.00	@ 75.00
M. R. granular (factory) . . . . .ton	54.50	@ 72.50
Synpro, gran. M. R. (fac.) . . . . .ton	55.00	@ 70.00

## Oils

Castor, No. 1, U. S. P. . . . .lb.	.16	@
No. 3, U. S. P. . . . .lb.	.15	@
Corn . . . . .lb.	.10	@
Cotton . . . . .lb.	.12	@
Cycline . . . . .gal.	.35	@ .38
Glycerine . . . . .lb.	.17½	@ .18
Linseed, raw . . . . .gal.	1.20	@
Palm lagos . . . . .lb.	.09½	@
Palm, niger . . . . .lb.	.08¾	@ .09
Peanut . . . . .lb.	.16	@
Petrolatum, standard . . . . .lb.	.06	@ .08
Petrolatum, sticky . . . . .lb.	.08	@ .10
Pine, steam distilled . . . . .gal.	.75	@
Rapeseed, refined . . . . .gal.	.86	@
blown . . . . .gal.	1.00	@
Rosin . . . . .gal.	.45	@ .50
Synpro . . . . .gal.	@	
Soya bean . . . . .lb.	.13	@
Tar . . . . .gal.	.27	@ .28
Woburn . . . . .lb.	.04½	@

## Resins and Pitches

Tar, pine, retort . . . . .bbl.	\$12.00	@ 12.50
kilm . . . . .bbl.	12.00	@ 13.50
Pitch, Burgundy . . . . .lb.	.05	@
coal tar . . . . .lb.	.01½	@
Fluxol hardwood . . . . .ton	40.00	@ 60.00
pine tar . . . . .lb.	.03	@
ponto . . . . .lb.	.08	@
Rosin, K (bbl.) . . . . .280 lbs.	6.50	@
strained (bbl.) . . . . .280 lbs.	6.40	@
Shellac, fine orange . . . . .lb.	@	
substitute . . . . .gal.	2.00	@

## Solvents

Acetone (98.99% drums [6.62	lb. per gal.] . . . . .lb.	*.25 @
Benzol (90% drums [7.21	lb. per gal.] . . . . .gal.	@
pure (drums) . . . . .gal.	.40	@
Carbon bisulphide (dms. [10.81	lb. per gal.] . . . . .lb.	.06½ @ .07
tetrachloride (drums, [13.28	lb. per gal.] . . . . .lb.	.09½ @ .10½
Motor gasoline (steel bbls.) . . . . .gal.	.21½	@
Naphtha, V. M. & P. . . . .gal.	.20½	@
solvent (drums extra) . . . . .gal.	.32	@
Cymene (factory) . . . . .gal.	1.50	@
Toluol, pure (7.21 lb. per	gal.) . . . . .gal.	@
Turpentine, spirits . . . . .gal.	1.21	@
wood, steam distilled . . . . .gal.	1.10	@

## Substitutes

Black . . . . .lb.	.09½	@ .14
Brown . . . . .lb.	.10	@ .15
White . . . . .lb.	.10	@ .16½
Brown factice . . . . .lb.	.08	@ .16
White factice . . . . .lb.	.09½	@ .16

## Vulcanizing Ingredients

Black hypo . . . . .lb.	.38	@
13% F. S. . . . .lb.	.21	@
Sulphur chloride . . . . .lb.	.05	@ .06
Sulphur, Bergenport brand, 100% pure (bbis.) . . . . .cwt.	2.75	@ 3.05
(bags) . . . . .cwt.	2.50	@ 2.80
Sulphur flour (bbis.) . . . . .cwt.	2.75	@ 3.30
(bags) . . . . .cwt.	2.50	@ 3.05

(See also Colors—Antimony)

## Waxes

Wax, beeswax, white, com . . . . .lb.	.40	@ .42
ceresine, white . . . . .lb.	.10	@ .11
carnauba . . . . .lb.	.52	@ .53
montan . . . . .lb.	.04½	@ .05
ozokerite, black . . . . .lb.	.23	@ .24
green . . . . .lb.	.27	@ .28
paraffine . . . . .lb.	.02¾	@ .05
sweet wax . . . . .lb.	.10	@ .12

## UNITED STATES TIRE EXPORTS, JULY-DECEMBER, 1922

In comparing the figures for United States tire and tube exports during the last six months of 1922 the outstanding features are the perceptible increases in exports to South America and the corresponding decline, except in solid tires, in shipments to Europe. Solid tire exports for December represented the only increase over those for July of the three classes listed.

## PNEUMATIC TIRES

	July	August	September	October	November	December
Europe . . . . .	\$656,507	\$529,482	\$414,017	\$505,215	\$412,493	\$385,631
N. Amer. . . . .	265,507	299,260	295,610	276,922	212,101	284,486
S. Amer. . . . .	187,965	143,179	225,733	307,316	231,242	252,864
Asia . . . . .	95,118	75,040	50,717	51,694	82,197	61,908
Oceania . . . . .	161,038	179,312	131,906	187,066	252,155	143,887
Africa . . . . .	51,372	66,653	123,377	87,842	66,830	63,015
Totals . . . . .	\$1,417,507	\$1,292,926	\$1,241,360	\$1,416,055	\$1,257,018	\$1,191,791

## SOLID TIRES

	July	August	September	October	November	December
Europe . . . . .	\$16,810	\$45,291	\$22,444	\$41,151	\$40,923	\$42,089
N. Amer. . . . .	36,353	37,571	47,887	30,869	49,133	21,835
S. Amer. . . . .	6,445	7,759	5,896	4,711	6,190	9,627
Asia . . . . .	12,376	20,791	13,694	12,404	21,541	30,248
Oceania . . . . .	19,795	15,188	17,138	34,174	55,921	43,821
Africa . . . . .	457	4,419	5,838	3,420	9,017	3,430
Totals . . . . .	\$92,236	\$131,019	\$112,897	\$126,729	\$182,725	\$151,050

## TUBES

	July	August	September	October	November	December
Europe . . . . .	\$83,337	\$66,239	\$41,270	\$46,739	\$40,925	\$27,158
N. Amer. . . . .	42,001	55,880	36,890	51,837	24,228	29,284
S. Amer. . . . .	14,884	18,926	26,828	28,098	34,068	40,297
Asia . . . . .	8,819	10,122	5,607	4,527	8,156	5,430
Oceania . . . . .	17,371	15,139	10,442	12,850	20,278	13,924
Africa . . . . .	4,711	6,528	8,444	7,157	7,385	9,609
Totals . . . . .	\$171,123	\$172,834	\$129,481	\$151,208	\$135,040	\$125,702

## MIXING MILL SPEEDS

The mixing effect of rubber mill rolls depends on the surface speed of the drive roll and the friction ratio between the rolls. Excessive heating of the stock, to the point of injury by scorching or partial vulcanization, results from too high speed and friction. All mill rolls are cored out for water cooling, but this control is seasonally variable.

Fifteen or twenty years ago the common practice of American builders of rubber mills was to gear the surface friction of the rolls at approximately 1½ to 1. In some lines this ratio is adhered to today.

By far the largest tonnage of rubber mixing pertains to the tire industry, in which organic accelerators of vulcanization are universally used. Some of these accelerated stocks are particularly sensitive to heat and liable to scorching in mixing, consequently the current practice favors a mixing mill drive roll surface speed from 125 to 130 feet per minute, the number of revolutions depending considerably upon the roll diameter. This speed, however, is subject to wide variation, dependent upon the character of the work to be done. In the case of mills for tire stock mixing the accepted standard friction ratio of surface speeds for the larger mills is 1½ to 1.

RUBBER HEELS WITH THE TRADE-MARK NAME OF "RUBBER ROAD" are being manufactured by The Brown Shoe Co., St. Louis, Missouri, and are used on the company's cheaper grades of shoes. For the better class of footwear the Goodyear "Wingfoot" rubber heels have been found very acceptable.

## Crude Rubber Arrivals at New York as Stated by Manifests

## Parás and Caucho

	Fine	Medium	Coarse	Caucho	Totals Pounds		Fine	Medium	Coarse	Caucho	Totals Pounds
APRIL 24. By "Pancras," Pará and Manáos.											
H. A. Astlett & Co.	25,300	2,720	10,120	9,500	47,640	MAY 7. By "Polycarp," I and Manáos.	26,350			21,500	48,050
H. A. Astlett & Co.			\$11,088		\$11,088	Paul Bertuch				6,944	6,944
Paul Bertuch	23,236		32,469	30,031	85,736	General Rubber Co.		44,800	2,240		47,040
General Rubber Co.	112,000				112,000	Meyer & Brown, Inc.	112,320				112,320
Meyer & Brown, Inc.					164,960	Poel & Kelly, Inc.	34,225		29,238	63,547	147,010
Poel & Kelly, Inc.	60,391		27,191	228,024	315,606	MAY 8. By "Raeburn," Pará.					
MAY 5. By "Santarem," Pará.						H. A. Astlett & Co.	26,250	3,160	10,200	5,740	45,350
H. A. Astlett & Co.	21,630	400	300	36,300	58,630	H. A. Astlett & Co.			\$11,088		\$11,088
Paul Bertuch			34,456		34,456	General Rubber Co.					\$14,480

\*Washed and dried in Brazil. †Cameté. ‡Fine and medium. \*\*Includes 650 pounds of Cameté.

## Plantations

(Figured at 180 lbs. net to the bale or case.)

Plantations			Pounds	Totals	Pounds	Totals
(Figured at 180 lbs. net to the bale or case.)			APRIL 26. By "Veendam," Rotterdam.		Hood Rubber Co. .... \$56,125	
	Pounds	Totals	L. Littlejohn & Co., Inc. .... 63,530		L. Littlejohn & Co., Inc. .... 1,030,400	
			Poel & Kelly, Inc. .... 38,944		Meyer & Brown, Inc. .... 246,400	
APRIL 17. By "Nile," Colombo.			Various ..... 53,400		H. Muehlstein & Co., Inc. .... 67,200	
H. A. Astlett & Co. ....	33,600		APRIL 27. By "Steel Traveller," Far East.		Poel & Kelly, Inc. .... 1,133,293	
Various ..... 33,360	66,960		Baird Rubber & Trading Co., Inc. .... 100,800		William H. Stiles & Co. .... 190,400	
APRIL 19. By "Bayern," Hamburg.			General Rubber Co. .... 13,440		Charles T. Wilson Co., Inc. .... 201,600	
L. Littlejohn & Co., Inc. .... 22,269	22,269		L. Littlejohn & Co., Inc. .... 1,041,600		Fred Stern & Co., Inc. .... 53,760	
APRIL 20. By "Maryland," London.			Various ..... 44,800		Various ..... 1,289,047	
Fred Stern & Co., Inc. .... 111,864			Meyer & Brown, Inc. .... 22,400		MAY 5. By "Hague Maru," Far East.	
William H. Stiles & Co. .... 33,600			H. Muehlstein & Co., Inc. .... 436,800		Baird Rubber & Trading Co., Inc. .... 134,400	
Various ..... 113,736	259,200		H. Muehlstein & Co., Inc. .... 436,800		L. Littlejohn & Co., Inc. .... 141,120	
APRIL 21. By "Berengaria," London.			Poel & Kelly, Inc. .... 78,288		Meyer & Brown, Inc. .... 134,400	
Various ..... 540	540		William H. Stiles & Co. .... 22,400		Poel & Kelly, Inc. .... 702,780	
APRIL 22. By "Nieuw Amsterdam," Rotterdam.			Charles T. Wilson Co., Inc. .... 123,200		Fred Stern & Co., Inc. .... 61,600	
L. Littlejohn & Co., Inc. .... 188,185	188,185		Various ..... 453,060		Various ..... 486,920	
APRIL 22. By "Robert Dollar," Far East.			Various ..... 1,313,872		3,650,660	
Baird Rubber & Trading Co., Inc. .... 369,600			APRIL 29. By "Cornia," London.			
General Rubber Co. .... 145,600			General Rubber Co. .... 743,680			
Hood Rubber Co. .... 33,600			Poel & Kelly, Inc. .... 234,104		977,784	
L. Littlejohn & Co., Inc. .... 1,344,000			APRIL 30. By "McKeesport," Havre.			
Meyer & Brown, Inc. .... 143,360			Various ..... 72,000		72,000	
H. Muehlstein & Co., Inc. .... 244,400			APRIL 30. By "Mississippi," London.			
H. Muehlstein & Co., Inc. .... 22,400			General Rubber Co. .... 379,680			
Poel & Kelly, Inc. .... 439,860			Meyer & Brown, Inc. .... 100,800			
Fred Stern & Co., Inc. .... 33,600			Various ..... 2,149,320		2,629,800	
William H. Stiles & Co. .... 44,800			MAY 1. By "London Commerce," London.			
Charles T. Wilson Co., Inc. .... 369,600			L. Littlejohn & Co., Inc. .... 467,258			
Various ..... 1,679,460	4,870,280		Various ..... 111,802		579,060	
APRIL 23. By "City of Cambridge," Far East.			MAY 1. By "Tuscania," Glasgow.			
L. Littlejohn & Co., Inc. .... 672,000			Various ..... 126,900		126,900	
Poel & Kelly, Inc. .... 553,438			MAY 2. By "President Van Buren," London.			
Fred Stern & Co., Inc. .... 336,000			Various ..... 21,600		21,600	
Charles T. Wilson Co., Inc. .... 145,600			MAY 2. By "Minerie," Far East.			
Various ..... 900			L. Littlejohn & Co., Inc. .... 33,820			
Various ..... 261,982	1,969,920		Various ..... 18,020		51,840	
APRIL 24. By "Baltic," London.			MAY 3. By "Hyson," Far East.			
Meyer & Brown, Inc. .... 11,200			H. A. Astlett & Co. .... 212,800			
Various ..... 5,040	16,240		Baird Rubber & Trading Co., Inc. .... 300,900			
APRIL 25. By "Thuringia," Hamburg.			General Rubber Co. .... 138,788			
Various ..... 29,160	29,160		Adolph Hirsch & Co., Inc. .... 22,400			
APRIL 25. By "Mengolia," Hamburg.			I. T. Johnstone & Co., Inc. .... 113,958			
Various ..... 1,980	1,980		L. Littlejohn & Co., Inc. .... 1,568,000			
APRIL 25. By "Albania," London.			Meyer & Brown, Inc. .... 201,600			
L. Littlejohn & Co., Inc. .... 11,578			H. Muehlstein & Co., Inc. .... 101,600			
Poel & Kelly, Inc. .... 667,549			Poel & Kelly, Inc. .... 285,991			
William H. Stiles & Co. .... 11,200			Fred Stern & Co., Inc. .... 123,200			
Charles T. Wilson Co., Inc. .... 1,120			William H. Stiles & Co. .... 123,200			
Various ..... 631,553	1,323,000		Charles T. Wilson Co., Inc. .... 22,400			
APRIL 25. By "Independence," London.			Various ..... 101,880			
General Rubber Co. .... 324,800			Various ..... 2,633,543		5,950,260	
Various ..... 133,480	458,280		MAY 4. By "Venusia," London.			
APRIL 25. By "City of Bagdad," Far East.			General Rubber Co. .... 592,400			
H. A. Astlett & Co. .... 134,400			Poel & Kelly, Inc. .... 421,344		1,013,744	
General Rubber Co. .... 323,355			MAY 4. By "Rotterdam," Rotterdam.			
Hood Rubber Co. .... 56,000			Various ..... 242,109		242,100	
J. T. Johnstone & Co., Inc. .... 497,728			MAY 4. By "Jalapa," Far East.			
L. Littlejohn & Co., Inc. .... 1,917,440			H. A. Astlett & Co. .... 224,000			
Meyer & Brown, Inc. .... 173,600			Baird Rubber & Trading Co., Inc. .... 112,000			
Poel & Kelly, Inc. .... 804,352			Fisk Rubber Co. .... 3,360			
Fred Stern & Co., Inc. .... 111,888			General Rubber Co. .... 351,680			
William H. Stiles & Co. .... 156,800			L. Littlejohn & Co., Inc. .... 33,548			
Charles T. Wilson Co., Inc. .... 282,240			Hood Rubber Co. .... 784,000			
Baird Rubber & Trading Co., Inc. .... 324,800			Meyer & Brown, Inc. .... 263,200			
Various ..... 2,431,072	7,315,920		H. Muehlstein & Co., Inc. .... 123,200			
			Poel & Kelly, Inc. .... 1,847,963			
			William H. Stiles & Co. .... 44,800			
			Charles T. Wilson Co., Inc. .... 168,000		3,955,751	
			MAY 5. By "Moerish Prince," Far East.			
			H. A. Astlett & Co. .... 112,000			
			Baird Rubber & Trading Co., Inc. .... 112,000			
			MAY 6. By "Pathan," Far East.			
			General Rubber Co. .... 313,600			
			Hood Rubber Co. .... 67,200			
			H. Muehlstein & Co., Inc. .... 100,800			
			Baird Rubber & Trading Co., Inc. .... 78,400			
			L. Littlejohn & Co., Inc. .... 1,008,000			
			Meyer & Brown, Inc. .... 112,000			
			Poel & Kelly, Inc. .... 250,985			
			Fred Stern & Co., Inc. .... 62,720			
			Various ..... 989,435		2,983,140	
			MAY 6. By "Meltonian," London.			
			General Rubber Co. .... 1,720,320			
			Various ..... 65,100		1,785,420	
			MAY 6. By "Vasconia," London.			
			L. Littlejohn & Co., Inc. .... 56,060			
			Poel & Kelly, Inc. .... 63,158			
			Various ..... 192,542		311,760	
			MAY 6. By "Adriatic," Liverpool.			
			General Rubber Co. .... 262,080			
			L. Littlejohn & Co., Inc. .... 11,263			
			Poel & Kelly, Inc. .... 28,860			
			Various ..... 79,757		381,960	
			MAY 7. By "Salawati," Far East.			
			H. A. Astlett & Co. .... 89,600			
			Fisk Rubber Co. .... 44,800			
			General Rubber Co. .... 281,210			
			J. T. Johnstone & Co., Inc. .... 49,209			
			L. Littlejohn & Co., Inc. .... 989,900			
			Meyer & Brown, Inc. .... 112,000			
			H. Muehlstein & Co., Inc. .... 89,600			
			Poel & Kelly, Inc. .... 206,342			
			Fred Stern & Co., Inc. .... 55,913			
			Charles T. Wilson Co., Inc. .... 40,320			
			Various ..... 433,121		2,392,020	
			MAY 9. By "President Polk," London.			
			General Rubber Co. .... 255,360			
			Various ..... 83,040		338,400	
			MAY 10. By "Southwestern Miller," London.			
			L. Littlejohn & Co., Inc. .... 111,811			
			Various ..... 27,870		139,680	
			MAY 11. By "Suveric," Far East.			
			H. A. Astlett & Co. .... 56,000			
			Meyer & Brown, Inc. .... 56,000			
			Charles T. Wilson Co., Inc. .... 100,800			
			Baird Rubber & Trading Co., Inc. .... 100,800			
			Hood Rubber Co. .... 56,100			
			Hood Rubber Co. .... 56,000			
			L. Littlejohn & Co., Inc. .... 404,400			
			Various ..... 469,440		1,299,540	
			MAY 11. By "Belgenland," Antwerp.			
			Baird Rubber & Trading Co., Inc. .... 11,000		11,000	

\*Arrived at Boston.

†Arrived at Baltimore.

## Crude Rubber Arrivals at New York as Stated by Ships' Manifests—Continued

Pounds	Totals	Pounds	Totals	Pounds	Totals
MAY 11. By "Half Moon," Far East.		MAY 18. By "Maine," London.		APRIL 25. By "Cristobal," Cristobal.	
Baird Rubber & Trading Co., Inc. ....	56,000	L. Littlejohn & Co., Inc. ....	482,831	Various .....	3,300
General Rubber Co. ....	627,200	Fred Stern & Co., Inc. ....	112,000	MAY 5. By "Gen. O. H. Ernst," Cristobal.	
L. T. Johnstone & Co., Inc. ....	12,185	MAY 18. By "City of Westminster," Far East.		Various .....	15,000
L. Littlejohn & Co., Inc. ....	1,258,880	L. Littlejohn & Co., Inc. ....	470,400		
Meyer & Brown, Inc. ....	193,760	Hood Rubber Co. ....	7,099		
Poel & Kelly, Inc. ....	409,973	Poel & Kelly, Inc. ....	288,507		
Fred Stern & Co., Inc. ....	97,004	MAY 18. By "Steel Worker," Far East.			
William H. Stiles & Co. ....	147,840	L. Littlejohn & Co., Inc. ....	918,400		
Charles T. Wilson Co., Inc. ....	100,800	Fred Stern & Co., Inc. ....	139,980		
Various .....	1,274,338	Poel & Kelly, Inc. ....	175,610		
	4,177,980	MAY 18. By "City of Benares," London.			
MAY 11. By "City of Norwich," Far East.		Hood Rubber Co. ....	35,840		
H. A. Astlett & Co. ....	996,800	L. Littlejohn & Co., Inc. ....	112,000		
Baird Rubber & Trading Co., Inc. ....	291,200	Poel & Kelly, Inc. ....	512,477		
General Rubber Co. ....	1,072,960		660,317		
Hood Rubber Co. ....	313,765				
L. T. Johnstone & Co., Inc. ....	384,290				
L. Littlejohn & Co., Inc. ....	1,792,000				
Meyer & Brown, Inc. ....	448,000				
H. Muehlstein & Co., Inc. ....	201,600				
Fred Stern & Co., Inc. ....	22,400				
William H. Stiles & Co. ....	246,400				
Charles T. Wilson Co., Inc. ....	319,200				
Various .....	52,535				
Various .....	674,450				
	6,569,200				
MAY 11. By "Menominee," London.					
General Rubber Co. ....	341,600				
L. Littlejohn & Co., Inc. ....	291,660				
Various .....	4,235,140				
	1,868,400				
MAY 13. By "Carmania," London.					
General Rubber Co. ....	67,200				
Poel & Kelly, Inc. ....	16,646				
MAY 13. By "Dakarian," Manchester.					
Various .....	16,200				
MAY 13. By "Celtic," Liverpool.					
Various .....	1,440				
MAY 13. By "Volendam," Amsterdam.					
L. Littlejohn & Co., Inc. ....	63,700				
Various .....	19,600				
	83,340				
MAY 14. By "Fort MacQuarie," Far East.					
L. Littlejohn & Co., Inc. ....	448,565				
Fisk Rubber Co. ....	1,793,001				
	2,241,566				

## Rubber Latex

APRIL 25. By "Independence," London.	
Various .....	1 case
MAY 4. By "Jalapa," Belawan-Deli.	
Various .....	120 tons
MAY 7. By "Salawati," Sourabaya.	
Various .....	115 tons
MAY 11. By "Half Moon," Belawan-Deli.	
Various .....	240 tons

## Africans

APRIL 29. By "Coronia," Liverpool.	
Poel & Kelly, Inc. ....	62,139
Various .....	181,631
	243,770
MAY 11. By "Belgenland," Antwerp.	
Baird Rubber & Trading Co., Inc. ....	24,830
Fred Stern & Co., Inc. ....	31,671
	56,501
MAY 13. By "Carmania," Liverpool.	
Various .....	4,255

## Centrals

APRIL 19. By "Panama," Cristobal.	
Various .....	9,900
	9,900

## Gutta Percha

APRIL 27. By "Steel Traveller," Java.	
L. Littlejohn & Co., Inc. ....	56,000
	56,000
MAY 6. By "Pathan," Singapore.	
L. Littlejohn & Co., Inc. ....	89,600
	89,600

## Gutta Siak

APRIL 30. By "City of Bagdad," Singapore.	
L. Littlejohn & Co., Inc. ....	78,400
	78,400

## Pontianak

APRIL 30. By "City of Bagdad," Singapore.	
L. Littlejohn & Co., Inc. ....	40,000
	40,000
MAY 6. By "Pathan," Singapore.	
L. Littlejohn & Co., Inc. ....	178,000
	178,000
MAY 7. By "Salawati," Java.	
L. Littlejohn & Co., Inc. ....	112,000
	112,000

## Balata

APRIL 23. By "City of Cambridge," Colombo.	
Various .....	1,200
	1,200
APRIL 26. By "Surinam," Paramaribo.	
Various .....	1,800
	1,800
MAY 3. By "Carrillo," Cristobal.	
Various .....	750
	750
MAY 6. By "Polycarp," Pará.	
Various .....	25,500
	25,500
MAY 11. By "Menominee," London.	
Various .....	6,750
	6,750

## United States Crude and Waste Rubber Imports for 1923 (By Months)

	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Totals	Balata	Miscellaneous	Waste
January .....	29,354	1,233	549	61			31,197	21,867	64	382
February .....	21,815	2,004	308	93			24,220	28,973	25	684
March .....	31,673	1,482	742	19			33,916	28,702	124	863
April .....	29,922	1,095	399	30	142		31,588	14,444	40	507
Totals, 4 months, 1923 .....	112,764	5,814	1,998	203	142		120,921		253	2,436
Totals, 4 months, 1922 .....	89,665	3,176	793	35	219	98	93,986	95	1,175	152

Compiled by the Rubber Association of America, Inc.

## Imports of Crude Rubber into the United States by Customs Districts

	January, 1922	January, 1923
	Pounds Value	Pounds Value
Massachusetts .....	361,620 \$40,896	1,434,957 \$274,406
Buffalo .....	4,645 764	
New York .....	51,755,980 7,809,760	74,537,865 13,423,042
Maryland .....		2,004,793 268,338
Los Angeles .....	1,788,600 248,217	1,073,174 192,365
San Francisco .....	100,101 11,185	600,766 130,244
Colorado .....		112,065 22,430
Totals .....	\$4,010,946 \$8,110,912	79,763,620 \$14,310,825

## Plantation Rubber Exports from Malaya

	January 1 to February 28, 1923	January 1 to April 12, 1923
	Singapore Pounds Malacca Pounds Penang Pounds	Swettenham Pounds Totals Pounds
To United Kingdom .....	1,272,700	1,128,700
The Continent .....	4,448,200	833,400
Japan .....	3,639,500	89,600
United States .....	52,682,900	5,441,200
British Possessions .....	506,300	105,700
Other countries .....	49,200	100
Totals .....	62,598,800	7,492,900
	10,363,300	2,574,425
		83,029,415

## Imports of Crude Rubber into the United States By Customs Districts

	February, 1922	February, 1923
	Pounds Value	Pounds Value
Massachusetts .....	371,419 \$47,427	1,579,241 \$480,825
Rochester .....		15 5
Buffalo .....	11,716 1,732	740 236
New York .....	65,700,447 10,660,885	57,669,180 12,430,580
Maryland .....		577,954 94,152
El Paso .....	121,000 24,200	
Los Angeles .....	312,100 64,064	
San Francisco .....	126,042 13,550	281,120 79,388
Colorado .....	101,516 15,248	271,040 65,637
Totals .....	\$6,744,240 \$10,827,106	60,379,290 \$13,150,823

## Rubber Exports from British Malaya

An official cablegram from Singapore states that the exports of rubber from British Malaya in the month of April amounted to 53,779,600 pounds (24,008 tons) as against 23,646 tons in March and 14,400 tons in the corresponding month of last year. Foreign imports into British Malaya amounted to 12,071,900 pounds (5,389 tons) in the month of April.

Appended are the comparative statistics:

	1922	1923
January .....	18,962	22,871
February .....	20,033	19,910
March .....	19,304	23,646
April .....	14,400	24,008
Total .....	72,699	90,435

## Exports of India Rubber Manufactures from the

EXPORTED TO—	Belting Value	Hose Value	Packing Value	Thread Value	Boots		Shoes		Canvas Shoes with Rubber Soles		Soles and Heels Value	Leather Cloth or Artificial Leather Value	Water-proofed Auto Cloth Value
					Pairs	Value	Pairs	Value	Pairs	Value			
EUROPE													
Austria .....							1,330	\$970					\$903
Belgium .....	\$3,473	\$243		\$2,987			2,116	1,414	96	\$89	\$16	\$2,582	1,325
Denmark .....			\$434		365	\$1,179	888	1,050	28,819	21,344	341	4,841	1,107
Finland .....	1,902											596	
France .....	5,685	1,812	284	23,204			144	97			80	60,565	562
Germany .....													205
Greece .....													
Iceland and Faroe Islands .....													
Italy .....					142	457			1,920	1,542		1,220	
Latvia .....													
Netherlands .....		4,112			863	1,888			700	931		371	719
Norway .....	255	4,054	30				5,943	5,241	26,425	17,714	491	2,058	140
Portugal .....		208			708	2,766							
Rumania .....			597										
Russia in Europe .....													
Spain .....			472		335	1,030					148	1,999	275
Sweden .....	1,252	1,870	69		67	234					247	5,194	253
Switzerland .....							1,700	1,122					
Turkey in Europe .....							580	617	103	92			
England .....	1,331	34,222	8,111	38,433	4,686	12,757	2,358	1,244	84,671	59,385	3,008	21,180	7,387
Scotland .....	519	1,500	1,893						8,088	5,085		2,876	566
Ireland .....											159		
TOTALS, EUROPE .....	\$14,417	\$48,021	\$11,890	\$64,624	7,166	\$20,311	15,059	\$11,755	150,822	\$106,182	\$4,490	\$103,482	\$13,442
NORTH AMERICA													
Canada—Maritime Provinces .....		\$379	\$30		871	\$2,985	3	\$3	60	\$63	\$79		
Quebec and Ontario .....	\$14,945	10,716	5,259	\$1,970	430	1,141	166	393	1,729	1,971	3,375	\$47,782	\$15,372
Prairie Provinces .....	139	579	39				269	558	768	737	2	485	225
Brit. Columbia and Yukon .....	3,855	551	621		194	737	63	122	527	383		1,116	489
British Honduras .....		12	32						24	22	64		
Costa Rica .....		364	20						112	145			
Guatemala .....		384	789								257		
Honduras .....	1,656	739	367				12	12	1,448	1,385	1,465		600
Nicaragua .....		886	140						264	321	717		
Panama .....	531	7,298	436		42	146			1,063	608	1,798		261
Salvador .....			83								6,473		
Mexico .....	24,159	21,229	13,106	1,149	31	165	4,848	2,437	67,005	54,543	11,434	3,313	330
Miquelon, etc. ....					1,320	4,354							
Newfoundland and Labrador .....					2,458	6,975	1,323	3,118	2,690	1,583	139		251
Bermuda .....		362			4	13	12	8	1,202	1,295	83		413
Barbados .....									72	54	17	83	323
Jamaica .....	125	503							677	815	104	359	
Trinidad and Tobago .....	65	188	474						264	219	55	110	
Other British West Indies .....		134	46				108	81	2,022	1,806	29		
Cuba .....	9,043	18,281	6,438		220	611	4,548	2,850	95,936	61,604	5,627	15,717	9,017
Dominican Republic .....		579	287						564	572	494	128	902
Dutch West Indies .....		65							4,121	3,553			
French West Indies .....									157	168			
Haiti .....	303	55	126						60	73	346	229	
Virgin Islands of United States .....		51	50						634	645	60		
TOTALS, NORTH AMERICA .....	\$56,254	\$63,010	\$27,714	\$3,119	5,570	\$17,137	11,352	\$9,582	181,399	\$132,585	\$33,960	\$69,322	\$28,183
SOUTH AMERICA													
Argentina .....	\$3,612	\$6,446	\$1,076		720	\$690	2,712	\$1,905	172,750	\$131,963	\$2,933	\$1,836	\$16,989
Bolivia .....	429											58	
Brazil .....	7,822	2,899	1,046	\$512			2,000	1,023	1,073	726	47	918	6,566
Chile .....	8,205	24,074	962		481	3,666	7,579	5,243	600	484		36	430
Colombia .....	286	2,090	571				140	93	790	575	2,549	1,737	78
Ecuador .....		1,534	563									480	210
British Guiana .....		2,152	47						1,152	1,099		75	
Dutch Guiana .....	72								96	115	310		
French Guiana .....													
Peru .....	4,601	11	578		96	410						1,160	248
Uruguay .....		461	677				6,356	5,622	2,444	1,697	1,502	530	1,232
Venezuela .....	453	388	1,036								2,571	1,465	195
TOTALS, SOUTH AMERICA .....	\$25,480	\$40,055	\$6,556	\$512	1,297	\$4,766	18,787	\$13,883	178,905	\$136,659	\$9,912	\$8,295	\$25,948
ASIA													
Aden .....													
British India .....	\$2,919	\$1,066	\$181						3,590	\$3,630	\$1,541		\$2,395
Ceylon .....		57											
Straits Settlements .....		1,242	68						864	671	693		
Other British East Indies .....												\$114	
China .....	4,171	6,325	536	\$3,918			238	\$215	2,675	1,994	27	2,431	599
Chosen .....			15				96	95					
Java and Madura .....	1,092	375	1,902						168	254	300	1,341	847
Other Dutch East Indies .....													
Far Eastern Republic .....		27	140										
French Indo China .....													
Hejaz, Arabia, etc. ....													
Hongkong .....		149			23	\$57	55	42	4,383	3,800		178	134
Japan .....	4,120	3,416	3,938	9,491	1,500	3,207	9,060	7,530	7	13		6,169	
Kwantung, leased Territory .....		57							251	341		704	
Palestine and Syria .....					100	106							
Persia .....							24	27					
Siam .....	326												
Turkey in Asia .....													
TOTALS, ASIA .....	\$12,628	\$12,714	\$6,780	\$13,409	1,623	\$3,370	9,473	\$7,909	11,939	\$10,703	\$2,561	\$10,937	\$3,975
OCEANIA													
Philippine Islands .....	\$3,840	\$2,011	\$1,098		168	\$411			72,794	\$60,035	\$15,659	\$4,833	\$2,612
Australia .....	4,328	888	1,687		192	439			66	64		43,587	5,280
British Oceania .....									282	322			
French Oceania .....			70						1,185	1,281			44
New Zealand .....	120	638	325		4,746	15,133	1,571	\$3,443					
Other Oceania .....									576	919			
TOTALS, OCEANIA .....	\$8,348	\$3,587	\$3,203		5,106	\$15,983	1,571	\$3,443	74,903	\$62,621	\$15,659	\$48,854	\$7,936

## United States by Countries During March, 1923

Water-proofed Clothing Value	Pneumatic Casings			Solid Tires			Pneumatic Tubes			Hard Rubber Goods			All Other Rubber Manufactures Value	Totals Value	
	Automobile		Others Value	Automobile and Motor Truck		Others Value	Automobile		Others Value	Tire Repair Materials Value	Druggists' Rubber Sundries Value	Battery Jars and Accessories Value			Other Electrical Supplies Value
	Number	Value		Value	Value		Number	Value							
260		\$4,069					260	\$512							\$6,454
535		12,742					247	684							\$1,128
\$40	8,093	105,189	1,833	\$1,703			6,076	9,645	\$169	\$734	\$192				5,430
458		7,160	480	207			346	735		1,123	89				2,004
1,341		16,815	504				305	756	62	2,141	1,492			\$1,976	14,098
136		2,598													128
236		3,353	150	168			50	100	60	70					4,106
18		300					13	35							335
1,081		11,259					288	472		92	129				1,865
59		1,112									3,791				4,903
649		9,151					136	225							2,270
4,183		58,856	205	11,057			955	1,152	11	146					2,059
15	587	6,871					3,920	8,913	36	353					3,305
104		1,398					110	159	10	11					900
	1,246	20,496		10,798	\$1,134		140	300							300
157	2,955	44,575	857	450	23		506	908		23	215	\$550			712
	1,086	16,869	1,324				1,824	6,107	173	3,486	1,216	556			3,321
	205	2,859					354	823	73						195
	64,121	518,267	9,237	59,663			22	74		394					2,270
366	1,602	13,975	806				44,405	47,219	1,829	3,755	20,279	265	\$5,027	19,510	77,277
	512	5,292					63	287	114		484				1,701
							563	669		105	364				6,589
\$578	89,467	\$863,206	\$15,448	\$84,046	\$1,157		60,583	\$79,775	\$2,557	\$12,433	\$28,251	\$1,371	\$5,027	\$20,486	\$116,415
\$145	34	\$409	\$101	\$49	\$13		27	\$47		\$56	\$190				\$2,558
1,437	3,573	76,974	746	14,936	140		2,333	8,787	\$82	3,184	14,971	\$5,981	\$6,283	\$10,117	108,560
567	795	8,098	19	351			502	617		174	1,427	840	102	74	6,373
830	292	3,654		1,242			129	241			784	7		480	3,573
	35	343					25	34			18		1		70
514	63	780					40	67		5					80
370	44	1,167	160				43	137							502
149	28	838					19	33			56		73		300
	121	1,648	72				35	63			14				33
28	1,169	14,969		1,511	678		914	1,734	13	45	118	270		40	1,979
389	371	10,149	3	531			333	1,006			14				177
39,171	1,960	27,764	64	1,063	1,030		1,947	6,687	263	866	3,260		169	1,115	17,154
3,283	416	5,858					530	1,019	18	72					4,364
65			4		479		106	166			24		245	83	522
	218	1,839		469			106	166			48				227
	768	10,248	11	745	22		576	704			109	25	125	2,240	74
609	203	2,484		583	46		103	183			175	32			723
	87	791	202	89			103	220			163	5	10		379
30,058	5,629	66,713	3,958	9,553	3,749		4,420	8,631	1,084	2,289	7,049	212	545	375	688
	540	5,895		2,835	122		375	731		5					10,883
	208	1,882					271	456	11	30	31				274,287
	221	1,802	31				2	17							231
	355	4,460	26	1,039	489		614	1,179		37	33				120
	31	393		281			50	102			163				6,148
\$77,607	17,101	\$249,158	\$5,397	\$35,276	\$7,683		13,497	\$32,861	\$1,491	\$7,210	\$28,279	\$7,435	\$9,689	\$12,284	\$155,384
	17,281	\$167,630		\$1,667	\$2,393		18,392	\$28,687		\$2,533	\$5,444	\$237		\$474	\$10,933
\$39	129	1,480					46	77							\$387,448
	7,501	67,820	\$180	274			5,060	6,304	\$544	359	2,503			51	5,362
	1,522	20,935	2,338	1,514	3,414		2,312	4,984			149		\$8,916	75	104,953
99	1,264	15,229	81	446	693		1,406	2,616	330	209	326				80,366
	198	3,268		566			100	216	26	64	43				33,284
66	5	171	28		70		157	260							11,207
64	22	331	6				36	72	4	28					3,924
							951	2,039		10					286
2,633	902	14,230		983			765	1,081		361	27	77			163
556	1,221	11,049	764	52			3,589	5,920		495	540		1		249
	2,319	24,227	290	1,169					120	24	580				1,643
\$3,457	32,364	\$326,370	\$3,687	\$6,671	\$6,570		32,814	\$52,256	\$1,024	\$4,083	\$9,612	\$314	\$9,084	\$600	\$24,633
	6	\$369													\$369
	3,328	30,033	\$416	\$7,103	\$9,429		1,640	\$2,278	\$83	\$90	\$266				\$545
	126	1,245		927			250	283			44				61,975
	1,379	13,762		2,128			800	1,377	64	16	130				2,556
															20,365
	311	4,922	219				114	292		12	677	\$275			114
	1,394	22,093	257	3,293			841	1,802	36	77					28,926
	413	5,654		348			306	745	92		121				25
	25	290													619
	334	3,075													34,388
\$47	84	738					244	341							6,747
	3,963	50,335	3,484	34,749			85	112		33	193				167
							2,400	4,291	476	219	1,792				290
35	211	2,212													3,416
							256	383							6,536
	178	1,785	75	30			97	230	30						1,053
	3	338		172			8	65							3,237
\$82	11,749	\$136,851	\$4,487	\$48,750	\$9,429		7,041	\$12,199	\$781	\$447	\$3,223	\$275			136,467
\$23,126	9,283	\$75,157	\$1,428	\$14,229	\$13,096		5,726	\$13,228	\$748	\$1,148	\$2,914				1,102
845	7,761	109,927	1,902	45,014	522		3,670	8,072	240	3,368	2,157	\$431	\$75	\$917	2,657
	45	623													106
	32	457	273		96		28	55	26		44				2,406
	10,592	131,917	2,303	19,166	283		4,646	11,811	123	2,695	342	44		292	191,188
	68	658	23				20	37		11					1,648
\$23,971	27,781	\$318,739	\$5,929	\$78,409	\$13,997		14,090	\$33,203	\$1,137	\$7,222	\$5,457	\$475	\$75	\$1,209	\$674,849

## Exports of India Rubber Manufactures from the United

AFRICA	Belting Value	Hose Value	Packing Value	Thread Value	Boots		Shoes		Canvas Shoes with Rubber Soles		Soles and Heels Value	Leather Cloth or Artificial Leather Value	Water-proofed Auto Cloth Value
					Pairs	Value	Pairs	Value	Pairs	Value			
British West Africa.....		\$210											
British South Africa.....	\$45,388	13,430	\$2,125	\$173	228	\$852	1,700	\$1,103	912	\$686	\$1,996	\$4,957	\$772
British East Africa.....			487						48	36			
Canary Islands.....											192		
Egypt.....		75										312	
Liberia.....													
Morocco.....		157											
Portuguese East Africa.....			1,179										
Other Portuguese Africa.....	5,896												
TOTALS, AFRICA.....	\$51,284	\$13,872	\$3,791	\$173	228	\$852	1,700	\$1,103	960	\$722	\$2,224	\$5,286	\$772
GRAND TOTALS.....	\$168,411	\$181,259	\$59,934	\$81,837	20,990	\$62,419	57,942	\$47,675	598,928	\$449,472	\$68,806	\$246,176	\$80,256

Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

## Rubber Statistics for the Dominion of Canada

## Imports of Crude and Manufactured Rubber

	January, 1922		January, 1923			February, 1922		February, 1923	
	Pounds	Value	Pounds	Value		Pounds	Value	Pounds	Value
UNMANUFACTURED—free									
Rubber, gutta percha, etc.					Rubber, gutta percha, etc.				
From United Kingdom.....	7,707	\$1,573	67,708	\$14,521	From United Kingdom.....	118,901	\$23,537	113,300	\$36,477
United States.....	1,362,683	257,876	1,938,434	532,465	United States.....	842,744	144,900	1,941,503	610,679
British East Indies.....					British East Indies.....				
Ceylon.....	112,000	21,683			Ceylon.....	44,777	9,212	168,000	43,176
Straits Settlements.....	1,124,221	207,233	179,413	40,970	Straits Settlements.....			447,051	122,597
Dutch East Indies.....			37,296	8,248	Dutch East Indies.....			233,899	74,966
Totals.....	2,606,611	\$488,365	2,222,851	\$396,204	France.....			71,826	32,039
					Other countries.....			44,982	5,515
Totals.....					Totals.....	1,006,422	\$177,649	3,020,561	\$925,449
Rubber, recovered.....	19,295	2,270	270,036	23,801	Rubber, recovered.....	198,806	22,253	265,672	28,147
Rubber, powdered, and rubber or gutta percha scrap.....	60,627	5,719	365,206	16,126	Rubber, powdered, and rubber or gutta percha scrap.....	114,207	5,593	392,975	13,917
Balata.....					Balata.....			109	93
Rubber substitutes.....	69,402	12,193	74,010	6,600	Rubber substitutes.....	69,121	8,766	41,213	9,307
Totals, unmanufactured...	2,755,935	\$508,547	2,932,103	\$642,731	Totals, unmanufactured...	1,388,556	\$214,261	3,720,530	\$976,913
PARTLY MANUFACTURED									
Hard rubber sheets and rods.....	48	\$56	1,160	\$637	Hard rubber sheets and rods....	237	\$221	25,521	\$9,407
Hard rubber tubes.....		912		2,650	Hard rubber tubes.....		2,052		
Rubber thread, not covered.....	10,169	12,628	16,749	20,088	Rubber thread, not covered.....	3,308	4,398	5,217	6,296
Totals, partly manufactured	10,217	\$13,596	17,909	\$23,375	Totals, partly manufactured	3,545	\$6,671	30,738	\$15,703
MANUFACTURED									
Belting.....		\$4,525		\$13,330	Belting.....		\$3,135		\$11,939
Hose.....		3,807		7,905	Hose.....		7,318		6,952
Packing.....		1,983		3,763	Packing.....		3,412		4,619
Boots and shoes.....		1,945		4,757	Boots and shoes.....		13,929		1,560
Clothing, including waterproofed.....		8,718		11,386	Clothing, including waterproofed.....		9,734		22,634
Gloves.....		1,195		1,776	Gloves.....		953		1,170
Hot water bottles.....		985		1,461	Hot water bottles.....		1,359		5,795
Tires, solid.....		16,826		5,295	Tires, solid.....		6,512		12,887
Tires, pneumatic.....		53,930		97,898	Tires, pneumatic.....		108,766		70,887
Inner tubes.....		7,095		3,551	Inner tubes.....		16,179		5,697
Elastic, round or flat.....		27,369		25,387	Elastic, round or flat.....		29,086		33,373
Mats and matting.....		246		214	Mats and matting.....		1,062		284
Cement.....		1,928		1,788	Cement.....		2,708		5,420
Other rubber manufactures.....		75,864		90,732	Other rubber manufactures.....		75,900		118,807
Totals, manufactured.....		\$208,417		\$269,243	Totals, manufactured.....		\$280,053		\$305,752
Totals, rubber imports....	2,766,152	\$730,560	2,951,891	\$935,349	Totals, rubber imports....	1,392,101	\$500,985	3,752,828	\$1,298,368

## Exports of Domestic and Foreign Rubber Goods

	January, 1922		January, 1923			February, 1922		February, 1923	
	Produce of Canada Value	Reex- ports of Foreign Goods Value	Produce of Canada Value	Reex- ports of Foreign Goods Value		Produce of Canada Value	Reex- ports of Foreign Goods Value	Produce of Canada Value	Reex- ports of Foreign Goods Value
UNMANUFACTURED					UNMANUFACTURED				
Crude and waste rubber.....	\$7,961	\$184	\$13,162	\$765	Crude and waste rubber.....	\$2,667	.....	\$14,819	.....
MANUFACTURED					MANUFACTURED				
Belting.....	\$14,453	.....	\$10,590	.....	Belting.....	\$10,463	.....	\$14,769	.....
Canvas shoes with rubber soles.....	38,948	.....	70,905	.....	Canvas shoes with rubber soles.....	65,410	.....	49,115	.....
Boots and shoes.....	36,914	.....	51,121	.....	Boots and shoes.....	18,284	.....	50,150	.....
Clothing, including waterproofed.....	1,050	.....	335	.....	Clothing, including waterproofed.....	2,212	.....	2,440	.....
Hose.....	4,622	.....	10,447	.....	Hose.....	16,240	.....	1,147	.....
Tires, casings.....	.....	.....	347,308	.....	Tires, casings.....	.....	.....	302,615	.....
inner tubes.....	.....	.....	31,733	.....	inner tubes.....	.....	.....	38,916	.....
pneumatic.....	214,810	.....	.....	.....	pneumatic.....	328,069	.....	.....	.....
solid.....	10,399	.....	8,242	.....	solid.....	8,057	.....	13,058	.....
vehicle.....	\$1,949	.....	\$1,462	.....	vehicle.....	\$1,824	.....	\$1,313	.....
Other rubber manufactures.....	44,467	.....	17,484	1,623	Other rubber manufactures.....	34,765	601	10,900	1,769
Totals, manufactured.....	\$365,663	\$4,475	\$548,165	\$3,085	Totals, manufactured.....	\$483,500	\$2,425	\$483,110	\$3,082
Totals, rubber exports.....	\$373,624	\$4,659	\$561,327	\$3,850	Totals rubber exports.....	\$486,167	\$2,425	\$497,929	\$3,082

## States by Countries During March, 1923—Continued

States by Countries During March, 1925—Continued																
Water-proofed Clothing Value	Pneumatic Casings			Solid Tires			Pneumatic Tubes			Hard Rubber Goods					Totals Value	
	Automobile		Others Value	Automobile and Motor Truck		Others Value	Automobile		Others Value	Tire Repair Materials Value	Druggists' Rubber Sun- and dries Value	Battery Jars and Accessories Value	Other Electrical Supplies Value	Others Value		All Other Rubber Manufactures Value
	Number	Value		Value	Value		Number	Value								
\$2,288	246	\$5,147				150	\$359								\$52	\$5,768
	9,685	98,221	\$751	\$1,681		4,800	8,079	\$287	\$2,027	\$789	\$357				2,348	188,320
	975	8,978	200			495	835	70							17	10,659
	126	1,505		1,036		127	574									3,307
	833	7,006				38	61			46						8,964
													\$108	\$232	1,117	122
	139	2,213		1,382		274	691		240							4,683
	2	30				4	11		286							1,500
						228	525									6,421
\$2,288	12,006	\$123,100	\$951	\$4,099	\$122	6,116	\$11,135	\$357	\$2,593	\$789	\$357	\$108	\$232	\$3,534		\$229,744
\$107,983	190,468	\$2,017,424	\$35,899	\$257,251	\$38,958	134,141	\$221,429	\$7,347	\$33,988	\$75,611	\$10,227	\$23,983	\$34,811	\$323,364		\$4,634,520

## Rubber Statistics for Germany

## Imports of Crude and Manufactured Rubber

	1922	
	Quintals	Thousand marks
UNMANUFACTURED—		
India rubber, raw or refined:		
From British India	61,398	
Ceylon	62,620	
Netherlands East Indies	99,057	9,982,858
Brazil	27,515	
Other countries	37,365	
Totals	287,955	9,982,858
Gutta percha, raw or refined	6,661	144,584
Balata	3,496	311,463
Waste rubber, gutta percha, balata	36,268	116,856
Totals, unmanufactured	334,380	10,555,761
Rubber substitute	115	4,461
MANUFACTURED—		
Rubber solution	13	25
Soft rubber dough, sheets, etc.	19	180
Cut unvulcanized sheets	34	1,825
Threads	144	15,962
Tires and tubes	2,217	49,235
Belting, hose and packing	153	5,418
Rubber footwear	5	89
Rubberized wagon covers	28	80
Rubberized goods	202	6,666
Other soft rubber goods	742	19,900
Press cloth and card clothing of rubber	547	119,998
Hard rubber goods	38	13,346
Totals, manufactured	4,142	232,724
Totals imported	338,637	10,792,946

## Exports of Crude and Manufactured Rubber

UNMANUFACTURED—		
India rubber, raw or refined:		
To Denmark	200	
Austria	2,268	
Czecho-Slovakia	525	462,545
Sweden	1,153	
Other countries	3,924	
Totals	8,070	462,545
Gutta percha, raw or refined	192	28,303
Balata	319	37,598
Waste rubber, gutta percha, balata	3,495	17,395
Totals, unmanufactured	12,077	545,841
Rubber substitute	4,422	54,796
MANUFACTURED—		
Rubber solution	2,796	62,070
Soft rubber dough, sheets, etc.	2,797	116,260
Cut unvulcanized sheets	306	15,207
Threads	1,066	350,363
Tires and tubes	44,182	3,621,535
Belting, hose and packing	26,111	1,840,382
Rubber footwear	5,757	471,706
Rubberized wagon covers	5	98
Rubberized goods	11,560	3,745,901
Rubber press cloths and card clothing	299	25,236
Other soft rubber goods	67,367	5,265,187
Hard rubber goods	7,439	2,241,058
Rubber goods not specified	71	1,604
Totals, manufactured	169,756	17,756,607
Totals exported	186,255	18,357,244

## Rubber Statistics for Scandinavia

## Imports of Raw and Manufactured Rubber

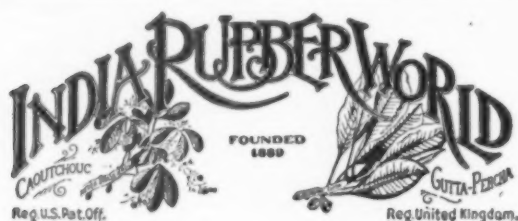
	Sweden	
	1921 Kilos	1922 Kilos
UNMANUFACTURED:		
India rubber	826,469	1,267,707
MANUFACTURED:		
Rubber footwear	84,079	104,736
Rubberized clothing and the like	183,120	212,845
Other soft rubber goods	1,260,957	2,164,982
Totals, manufactured	1,528,156	2,482,563
Totals, imports	2,354,625	3,750,270
Norway		
UNMANUFACTURED:		
India rubber and gutta percha	193,241	332,059
MANUFACTURED:		
Tire covers	198,856	384,046
Sheets, threads, tubes	122,511	217,551
Soles, rings, mats	269,575	218,523
Footwear	345,260	432,405
Other	26,839	43,893
Totals, manufactured	963,041	1,296,418
Totals, imports	1,156,282	1,628,477

## Denmark

UNMANUFACTURED:		
India rubber	258,200	136,200
MANUFACTURED:		
Footwear	96,300	140,100
Bicycle tire covers	326,400	438,800
Automobile tire covers	432,900	738,200
Bicycle tubes	41,600	96,600
Automobile tubes	23,900	41,700
Other tubes	48,300	77,300
Motor tires	135,800	202,200
Bicycle tubes without fabric	22,300	3,300
Other rubber goods with fabric	188,100	219,500
Other rubber goods	140,100	177,100
Totals, manufactured	1,455,700	2,134,800
Totals, imported	1,743,900	2,271,000

## Exports of Raw and Manufactured Rubber

	Sweden	
	1921 Kilos	1922 Kilos
UNMANUFACTURED:		
Waste and old rubber	214,626	244,598
MANUFACTURED:		
Rubber footwear	286,387	314,462
Norway		
MANUFACTURED:		
Belting of rubber or balata	37,007	72,306



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